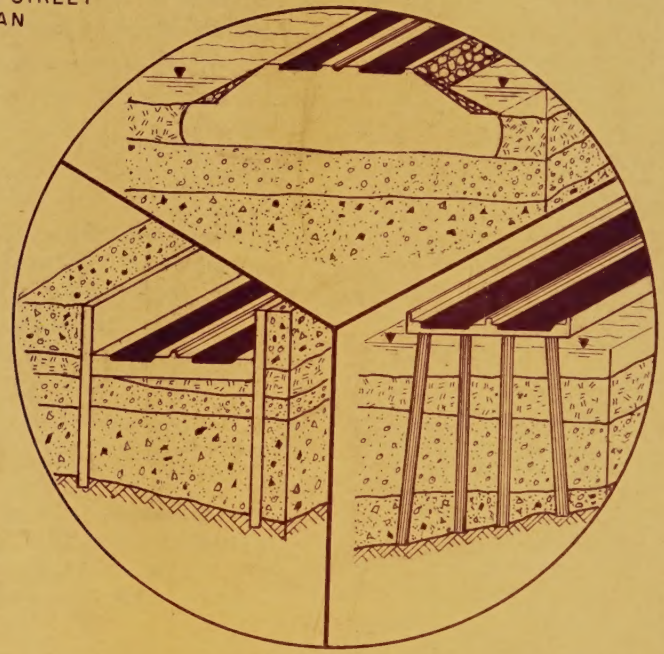
PRELIMINARY SOILS AND FOUNDATION STUDY

FOR THE
INTERSTATE ROUTE CONNECTION 518

WEST SIDE HIGHWAY

FROM THE BATTERY TO 42ND STREET
BOROUGH OF MANHATTAN
P.I.N. 0024.11.111



STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

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PRELIMINARY SOILS AND FOUNDATION STUDY

INTERSTATE ROUTE CONNECTION 518

WEST SIDE HIGHWAY FROM BATTERY TO 42nd ST.

PIN 0024. 11-111

BOROUGH OF MANHATTAN

E.V. HOURIGAN
PROJECT MANAGER
NEW YORK CITY WEST SIDE EXPRESSWAY
CAMPUS SITE
ALBANY NEW YORK

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OCTOBER 1972

NEW YORK STATE
DEPARTMENT OF TRANSPORTATION

1220 Washington Avenue, State Campus, Albany, New York 12226

October 16, 1972

Mr. Edward V. Hourigan
Project Manager
NYC West Side Expressway
NYS Dept. of Transportation
Building 5 - Room 108
1220 Washington Avenue
Albany, New York

Subject: Transmittal of Soils and Foundations Report for the Proposed West Side Highway
PIN 0024.11.111

Dear Mr. Hourigan:

In accordance with your request and authorization to proceed dated January 13, 1972, this Bureau has completed an initial preliminary soils and foundations study for the proposed West Side Highway Corridor.

The report which follows represents an in-depth analysis oriented toward providing a basis for analyzing and evaluating foundation feasibility and estimated costs for alignment alternates within the proposed corridor. Final design studies for an established alignment will, of course, require further detailed investigation and analysis which we are prepared to undertake upon your authorization to proceed.

This Bureau's participation in this project has been under the direction of Mr. Richard S. Cheney, Senior Soils Engineer, under the writer's supervision. Formal acknowledgment is noted herein of the excellent cooperation received from Mr. J. Griek, Region 10 Soils Engineer and the Region's Soil Section. Close liaison has been maintained during the progression of this report with representatives of the Managing Consultants, Parsons, Brinkerhoff, Quade and Douglas and your office to insure that our studies provided the required information for this stage of design. We will be available to provide further assistance as necessary.

Very truly yours,

Wm. P. Hofmann, Director
Soil Mechanics Bureau

By:
Bernard E. Butler
Bernard E. Butler
Associate Soils Engineer

BEB:MVM

cc: Mr. G. W. McAlpin
Mr. A. H. Emery

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CONTENTS

	Letter of Transmittal	i
	Contents	ii
I	Introduction	1
II	Subsurface Conditions	1
III	Results of Engineering Feasibility Studies	3
	A Pile Foundation Design Study	4
	1. Drawing No. 10SM 1844-Pile Type Analysis	4A
	2. Drawing No. 10SM 1841-Pile Analysis Summary	4B
	B Embankment Foundation Design Study	4
	Drawing No. 10SM 1838-Proposed Embankment Sections	4C
	C Depressed Roadway Design Study	5
	Drawing No. 10SM 1843-Depressed Roadway Treatment Summary	5A
IV	Future Foundation Investigation and Design Studies	5

Appendix

Drawing No.	Title
10 SM 1834	General Notes
10 SM 1834A	Boring Location Plan-Battery to Vesey St.
B	" " " -Vesey St. to Hubert St.
C	" " " -Hubert St. to Leroy St.
D	" " " -Leroy St. to Horatio St.
E	" " " -Horatio St. to W. 21st St.
F	" " " -W. 21st. St. to 30th St.
G	" " " -W. 30th St. to 42nd St.
10 SM 1835A	General Subsurface Profile Along Existing Alignment - Battery to Watts St.
10 SM 1835B	" - Watts St. to 13th St.
C	" - 13th St. to Pier 72
D	" - Pier 72 to 42nd St.
E	General Subsurface Profile East of Pierhead Line- - Battery to Pier 28
F	" - Pier 28 to Pier 46
G	" - Pier 46 to Pier 64
H	" - Pier 64 to Pier 66
I	General Subsurface Sections - C-C and D-D
K	" - E-E and F-F
J	" - G-G and H-H
L	" - I-I

Drawing No.	Title
10 SM 1836A	Contour of Rock Surface-Battery to Barrow St.
B	" -Barrow St. to 42nd St.
10 SM 1847A	Subsurface Information Logs - P21, P21A, P40
B	" - P58
C	" - P66
D	" - P76
10 SM 1840A	Summary of Laboratory Test Data - P21, P21A, P40
B	" - P66
C	" - P76
10 SM 1846A	Soil Properties Profile - P21, P21A
B	" - P66
C	" - P76
10 SM 1842A	Consolidation Test Summary - P21A
B	" - P21A
C	" - P21A
D	" - P66
E	" - P66
F	" - P66
G	" - P66
10 SM 1845	Consolidated Undrained Shear Stress Summary

I INTRODUCTION

In accordance with your request and the authorization contained in your memorandum to this Bureau on January 13, 1972, we have completed a preliminary foundation design study for the proposed West Side Expressway Project. The corridor analyzed extends from the Battery to 42nd St. and is bounded on the east by the existing West Side Highway and on the west by the pierhead line. The scope of this task included: collection of existing subsurface data; performing additional preliminary borings where needed within the corridor, detailed laboratory and field testing on samples from these new borings; analysis and correlation of existing and new boring data; plotting of boring information on base maps; preparation of a detailed preliminary report on subsurface conditions and indicated foundation design alternates with related factors on estimated costs and construction considerations.

The new boring work, included in this report, was begun by State Forces from the Region 10 Soils Section on February 14, 1972 and completed July 6, 1972, at which time a total of 6 borings had been completed, representing 802 linear feet of soil boring and 79 linear feet of rock coring. The subsurface information logs for these borings are shown on Drawing Nos. 10 SM 1847A thru D. During this program, 54 undisturbed Shelby tube samples and 138 split spoon samples were obtained and subsequently analyzed in our laboratory. In addition, specialized soil testing was performed in the field including 26 vane shear tests to determine in-situ soil strength; testing for an indication of the corrosive potential of the soil by utilizing the Geonor Corrosion Sound in the field and obtaining sulfate content from samples analyzed in our laboratory, and; utilization of geophysical soundings to determine generalized soil boundaries. The latter investigation which was experimental, was performed under a contract issued to Alpine Geophysical Associates Inc. on June 6, 1972 which was completed on June 26, 1972. The results of this study were, unfortunately, negative since the soil deposits explored were extremely soft, gaseous and not subject to interpretation by this or other types of geophysical methods. The Soil Mechanics Bureau furnished supervisory personnel for this study.

Summaries of the results of analysis of existing explorations are included herein in the form of subsurface profiles, cross-sections, and contour drawings. The results of selected laboratory tests have been tabulated, correlated, and plotted and are included in this report.

During this corridor study, generalized additional design data for specific alternate highway alignments and interchanges have been transmitted to Parsons, Brinkerhoff, Quade & Douglas, Managing Consultants for this project. However, no specific alignments within the corridor will be discussed in this report because their status on location, grade line and type of pavement support has not yet reached a stage which justifies a detailed evaluation. This report is intended to establish generalized foundation design criteria to permit relative assessments of various alignments within the corridor. Detailed foundation design information will be gathered and transmitted after the final alternate alignments are selected.

II SUBSURFACE CONDITIONS

The subsurface profiles and cross-sections contained in the Appendix (Drawing Nos. 1835A thru L), indicate radical variations in soil and rock conditions within the corridor. The bedrock underlying the area covered by this report belongs to the Manhattan Formation. The cores obtained consisted of a mica schist with numerous muscovite flakes covering the foliation surfaces. The rock is highly folded and forms ridges with major axes trending generally north-south. The low areas between the ridges are filled with glacial drift overlain by recent alluvial deposits. The glacial drift is composed primarily of red or gray glacial till. The red glacial till is younger and was deposited by ice moving in from the west, the older gray till was deposited by ice moving in from the north. These red and gray glacial tills are respectively described on the subsurface profiles included in the Appendix as either Red Brown Sand, Silt, and Gravel with Boulders, or Gray Sand with a trace of Silt and Gravel with Boulders.

The land portion of this corridor is covered with a mantle of miscellaneous fill containing all types of soil in addition to wood, concrete, and metal fragments. We feel that the soil samples extracted from the borings are not totally representative of the fill due to the large size material which was encountered but could not be sampled. A research of old New York City maps disclosed that the shoreline was located along Greenwich St. in 1767. The approximate location of this shoreline and the present bulkhead line is shown on Drawing Nos. 10 SM 1836A and B. Since this fill has been in place for many years we assume that the underlying soil deposits are fully consolidated under the weight of the fill.

It is worthy of note that fill material was encountered at great depths between stations 0 and 100 within the present bulkhead line and stations 30 and 65 near the pierhead line. This fill material was mixed with the very soft organic silt found above. We believe that this material was transported by means of large shear failures caused by uncontrolled filling over the very soft organic silt deposit.

On the river side of the bulkhead line many piers exist which extend varying distances into the river. The majority of these piers have not been in use for many years. During a pier's useful life, periodic dredging of the pier slip was necessary to maintain a navigable channel for docking. The sediments which flow into these pier slips are deposited to form a very loose soil matrix. Eventually as more sediment is deposited, the soil consolidates under its own weight. This type of recent deposition produces a "normally consolidated" soil deposit, i.e. the subsoil has never been subjected to any loading other than the weight of the soil which exists above.

The results of laboratory testing on samples from this deposit are shown on Drawing Nos. 10 SM 1842A & B, 10 SM 1842A & D, 10 SM 1845 and 10 SM 1846 A & B of the Appendix. The thickness of this soil deposit varies rapidly between adjacent piers because the soil immediately beneath the piers has never been dredged. Although we have not obtained a continuous profile of the actual river bottom we assume that it resembles a series of subsurface "hills" and "valleys" in the north-south plane.

Due to the unusual nature of the soil between the bulkhead and pierhead lines, the lack of existing data, and the expeditious nature of this preliminary phase of the project it was necessary to confine our preliminary boring program to the waterborne alignment. From these recent borings we have established the boundaries of various soil layers and ascertained the physical characteristics of each layer. Our laboratory testing was confined to the two compressible layers described on the profiles as "Gray Organic Silt with a trace of sand and shells", and "Layered Gray Organic Silt with a trace of sand, Gray Sand and Silt." Within the boundaries of each of these generalized layers certain variations exist with regard to strength and consolidation properties. Summarization and correlation of physical properties and strength and consolidation properties are shown on Drawing Nos. 10 SM 1840A thru C, 10 SM 1842A thru G, 10 SM 1845, and 10 SM 1846A thru C. These layers are next discussed in more detail.

A. GRAY ORGANIC SILT WITH A TRACE OF SAND AND SHELLS

This layer may be subdivided into two parts; the first being the recently deposited colloidal material described above and the second being material which has been in place long enough to consolidate under its own weight and exhibit definite strength and consolidation properties.

The upper zone of this deposit is characterized by its black color and the amount of oil and other pollutants contained in the samples. This material is extremely unstable, corrosive, and compressible. Application of the lightest loads will cause shear failures or large settlements. Under load application the rate of consolidation and strength gain is too slow to permit a reasonable duration of stage construction without partial excavation. This material is so soft that the surface cannot be determined by ordinary soundings. An attempt to use geophysical methods failed due to pockets of gas and/or organic material causing damping and distortion of the reflection waves. If close river bottom control is necessary, we recommend utilizing sounding rods equipped with wire mesh screening pads having a large surface area.

The lower zone of this deposit has been in place for many years and contains considerably less organic material and more sand. The process of deposition was the same as for the upper zone, but no pollutants were found in samples from this zone. Also, the strength and compressibility properties of this lower zone are slightly better than the above. The important difference is in the more rapid rate of consolidation and strength gain due to loading in this lower zone. The drainage characteristics of this material indicate that a controlled sequence of loading would be feasible, although a large amount of consolidation may be expected from this portion of this stratum. Termination of any type of pile foundation is not feasible within this deposit.

In addition pile foundations which extend through this entire stratum are assumed not to develop any useful frictional resistance in either zone. A measure of the corrosive potential of the entire layer was estimated by means of the Geonor Corrosion Sound and by laboratory analyses to determine the sulfate content of all samples within this layer. The following table summarizes the results of this testing:

TABULAR SUMMARY OF CORROSIVE POTENTIAL DETERMINATIONS

GEONOR SOUND METHOD **

Location	*Test Depth (feet)	Current I(mA)	Resistance R(ohm)	Percent Depolarization
Pier 58	15	1.[illegible]	[illegible].1	[illegible]1.2
100 ft	20	[illegible].[illegible]	5.9	[illegible]2.[illegible]
from	25	1.[illegible]	6.1	[illegible]1.2
out-	30	1.[illegible]	5.9	[illegible].
board	35	125	6.1	[illegible]7.5
edge	40	11[illegible]	7.[illegible]	[illegible]5.[illegible]
	45	1[illegible]	7.[illegible]	[illegible]4.2
	50	12[illegible]	6.[illegible]	[illegible]3.[illegible]
	55	125	[illegible].8	[illegible]2.5
Pier 66	15	[illegible]	[illegible].	[illegible]7.3
100 ft	20	11[illegible]	[illegible].	[illegible]5.[illegible]
from	25	125	7.[illegible]	[illegible]2.9
out-	30	[illegible]	7.[illegible]	[illegible]3.[illegible]
board	35	11[illegible]	8.[illegible]	75.3
edge	40	125	8.[illegible]	[illegible].7
	45	125	[illegible].[illegible]	[illegible]2.5
	50	125	6.2	[illegible].[illegible]
	55	125	7.[illegible]	[illegible].[illegible]
Pier 72	15	115	[illegible].[illegible]	[illegible]7.1
150 ft	2[illegible]1	1[illegible]	[illegible].[illegible]	75.[illegible]
from	15	1[illegible]3	[illegible].[illegible]	59.2
out-	2[illegible]	1[illegible]	[illegible].[illegible]	5[illegible].[illegible]
board	25[2]	1[illegible]	[illegible].	55.3
edge				

1 Refusal @23.5 ft.
2 Refusal @28.5 ft.

PORE WATER SULFATE CONTENT

Drill Hole	Tube No.	*Test Depth (feet)	Pore Water Sulfate Content Parts per million ***
P66	T1	20	527[illegible]
	T[illegible]	30	[illegible]111
	T6	5[illegible]	2[illegible]95
	T8	6[illegible]	594[illegible]
	T10	7[illegible]	2041
	T12	80	1[illegible]65
	T14	90	3421
	T16	101	[illegible]5[illegible]5
	T18	112	2[illegible]
	T2[illegible]	12[illegible]	1920
	T22	13[illegible]	15[illegible]
	T25	149	50[illegible]
	T27	1[illegible]0	[illegible]54[illegible]
	T29	17[illegible]	32[illegible]
	T31	1[illegible]0	[illegible]

* Test depths referenced from pier surface

** For additional information regarding the Geonor Method see Publication No. 42 of the Norwegian Geotechnical Institute-Oslo, Norway, 1961

*** Sulfate determination performed by N.Y.S. D.O.T., Materials Bureau

Our interpretation of these results indicates that this material is corrosive to steel piles at all depths tested. The test data indicates that a steel corrosion rate of up to 1mm per year can be expected for unprotected steel piles. In addition, the sulfate tests indicate an average value of 3400 parts per million (ppm) with a minimum value of 1570 ppm and a maximum of 5943 ppm. The U.S. Department of Interior - Bureau of Reclamation's Concrete Handbook considers the relative degree of sulfate attack as considerable for 1000-2000 ppm and severe for over 2000 ppm. In both cases the handbook recommends the use of Type V cement to prevent loss of material and strength due to corrosion. The effect on resistance to sulfate attack by increasing pile density with centrifugally spun precast piles is not quantitatively known, however, it is reasonable to expect this type of concrete to better resist sulfate attack.

This corrosion test data appears to be contradicted by field data gathered by the various agencies involved with waterfront construction along the Hudson River. The most recent study which discusses this subject was completed in 1966 by the Port of New York Authority and is described in a publication entitled, "Marine Piling Corrosion-New York Harbor." Therefore, we recommend that a detailed field study of pile corrosion in this area be made prior to designing foundations for corrosion protection. This study could be done on existing piles supporting the present waterfront structures, many of which are currently being demolished.

Further data could also be gathered on the pier foundations previously inspected by the Port Authority and contained in the aforementioned publication.

B. LAYERED GRAY ORGANIC SILT TRACE SAND, GRAY SAND AND SILT

This ancient alluvial deposit extends to great depths especially toward the northern end of the project. This deposit may also be subdivided into two zones of approximately equal thickness. However, the distinction between these divisions is basically with regard to the relative compressibility of each zone.

From a detailed interpretation it appears that the upper zone contains a larger percentage of sand and silt layers than the lower. This difference is best shown by the void ratio versus log pressure diagrams on Drawing Nos. 10 SM 1842F and G. Note that the compression index (C_c) for the upper zone is much less than the lower.

In general, both zones of this deposit can sustain the effects of moderately high loadings. Any resulting consolidation of this deposit will occur nearly as soon as the load is applied. In addition, friction pile foundations may be safely installed in this deposit with only small settlements resulting.

III RESULTS OF ENGINEERING FEASIBILITY STUDIES

Our foundation studies have been concentrated in three areas: pile supported structures, roadway embankment construction, and depressed roadway sections. All of the above alternates can be constructed within the boundaries of the subject corridor. However, in particular areas certain alternates are of a lesser degree of difficulty to construct and consequently less costly than others. Due to the weak compressible nature of the surface soils, spread footings are not recommended for any major structures within the subject corridor.

The following summary, supplemented by referenced drawings, will provide a rational basis for comparing design alternates and preparing preliminary foundation designs.

A. Pile Foundation Design Study

The properties of the subsoil within this corridor dictate that all proposed major structures be supported on deep pile foundations. Therefore, an exhaustive analysis was made to compare the desirability and economic feasibility of various pile types. The feasible pile types are listed on Drawing No. 10 SM 1844 which displays for each, the recommended design capacity in tons and the cost per ton capacity per foot of length. Due to the great depth to bearing and/or the anticipated high loads to be supported only three types of high capacity piles were found to be economical.

A further analysis of the subsurface profiles within this corridor permitted a generalized segment by segment breakdown in which similar pile foundation design alternates could be utilized. The results of this analysis and recommended pile types, lengths, and costs are shown on Drawing No. 10 SM 1841. Note that the estimated costs shown thereon are related to 1971-72 prices and do not reflect anticipated future changes. Lateral load soil resistance will not be analyzed until specific alternate alignments and anticipated design loadings are established.

In general the depth to a bearing layer of glacial till or ledge rock along any land-based alignment is relatively small, i.e. 50 to 100 ft. The exception occurs in the area between 22nd and 34th Streets where land alignments built close to the bulkhead line will traverse the edge of a deep gorge. In this vicinity pile lengths could approach 180 feet. A major problem on land-based alignments will be advancing piles through obstructions to bearing. For this reason we recommend that reinforced tips be added to all bearing piles. The price for these points has been included for recommended steel 14BP117 piles shown on Drawing No. 10 SM 1841.

The waterborne alternates will cross a variety of complex soil deposits in this corridor as shown on the enclosed soil profiles and cross-sections. A representation of the variable depth to rock surface is shown on Drawing Nos. 1836A and B. From a foundations standpoint, the most economical alignments can be achieved by skirting the edges of these deep gorges which have their major axes in a general north-south direction. All piles driven to end bearing will exhibit only negligible settlement under the recommended loads. However, if friction piles are chosen, the location within the gorge will determine the amount of expected settlement. These settlement estimates are beyond the scope of this report but will be included in future reports for appropriate alternates.

B. Embankment Foundation Design Study

In many areas of waterborne alignments within the corridor, roadway embankment could be used in lieu of structures. The sections shown on Drawing No. 10 SM 1838 indicate a preliminary determination of the requirements for embankment construction with two alternate side slopes. In addition, the cost estimates shown thereon have been subdivided to facilitate approximations for the geometrics required at different locations. The information displayed on this drawing was based on the following assumptions:

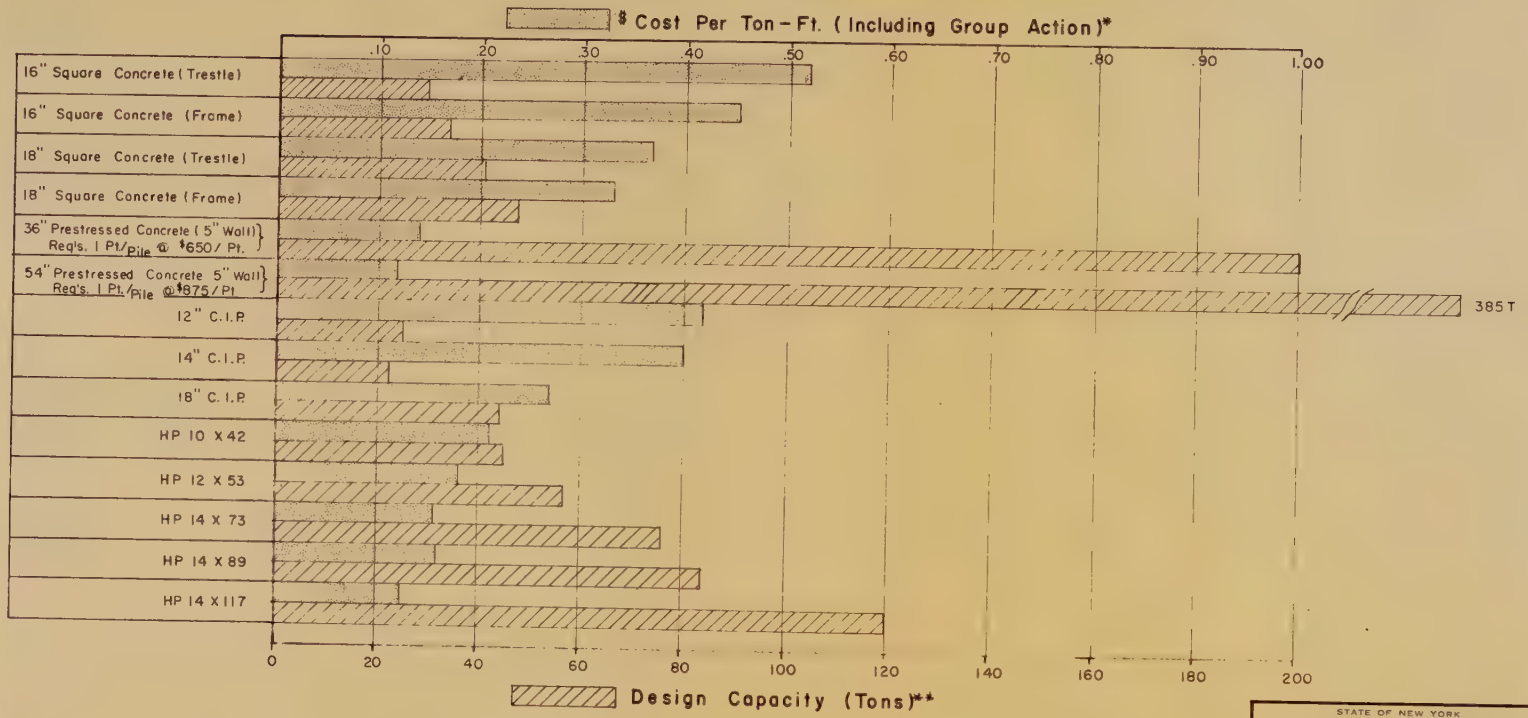
1. The location of the outboard toe of slope for an embankment cannot encroach on the channel of the Hudson River. The outboard limit is defined by the pierhead line as established by the U.S. Corps of Engineers.
2. Any excavation of organic material would be made with a hydraulic dredge directly loading into barges for disposal at sea.
3. Fill material could be used which was locally available (New York Bay area) and able to be placed hydraulicly underwater by controlled methods.
4. The final grade of the embankment would be 12 feet above the average existing water surface.
5. The excavation and fill quantities used for the cost estimates are based on average soil conditions along the corridor.

Of the two alternates shown on Drawing No. 10 SM 1838, the embankment section with a 1 vertical on 4 horizontal side slope is the most economical. The embankment section utilizing a 1 on 3 side slope is the steepest which may be safely constructed without additional special stability treatment such as relieving platforms. After the required excavation, either embankment alternate must be constructed in two stages, as shown on Drawing No. 10 SM 1838, with waiting periods beginning at the completion of filling for each stage. A six month waiting period is required after the first stage before embankment construction can safely continue to final grade. An additional one year waiting period is required after stage two completion to reduce differential embankment settlement to acceptable values before paving.

Sand drains will be required to reduce differential settlements in areas where the roadway embankment adjoins or straddles the existing bulkhead and at approaches to proposed pile supported structures. These sand drains should be installed by the non-displacement method. The approximate cost for sand drains required in bulkhead areas is estimated at $2500 per station per 10 feet of roadway width which extends from the bulkhead into the river to the top of slope location. The approximate cost for sand drains required at approaches to proposed pile supported structures is a lump sum of $50,000 per approach.

It is important to note that the organic material excavated to permit embankment construction could be utilized as fill in the construction of land between the existing bulkhead and proposed embankment. A cap of granular fill would be required over the organic material. The land so treated could be stabilized in about six years at minimal cost. If necessary the stabilization could be accelerated by the use of sand drains. In addition to creating usable land, this procedure

SUMMARY OF ANALYSIS FOR ALTERNATE PILE TYPES



*Group action includes adjustment of design capacity to account for pile spacing.

**An allowable stress of 9,000 psi was used for the H-Pile analysis.

PREPARED BY:

DRAWN BY:

CHECKED BY:

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
BUREAU OF SOIL MECHANICS

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42 ND STREET BOROUGH OF MANHATTAN
PIN 0024.11.111

PILE TYPE ANALYSIS

APPROVED 10/13 1972
DIRECTOR

DISTRICT NO. 10
COUNTY MANHATTAN

DWG NO 10 SM 1844

SUMMARY OF PRELIMINARY FOUNDATION DESIGN CRITERIA

PILE ANALYSIS FOR STRUCTURE ALTERNATES

Location: Corridor Segment	Location: Lateral Limit Within Segment	Pile Type	Allowable Load Cap. Tons	Pile length ft: Range	Pile length ft: Average	Cost: per ft. of pile	Cost: per ton of load capacity	Remarks
Battery Liberty St.	-	-	-	-	-	-	-	Not applicable - see depressed roadway treatment
Liberty St.- North Moore St.	Bulkhead - Pierhead Line	54" dia. pre-stressed conc.	[illegible]		[illegible]	[illegible]	[illegible]	Pile length not expected to vary across corridor
North Moore St. Barrow St.*	Bulkhead-Pierhead Line	54" dia. pre-stressed conc.	[illegible]	[illegible]	[illegible]	*** [illegible]	[illegible]	Pile lengths increase from pierhead to bulkhead line
	East of Bulkhead Line	14BP117 w/pts.	120	[illegible]	[illegible]	[illegible]	[illegible]	Obstructions to pile driving may be encountered to 50 feet
Barrow St.- 14th St.	Bulkhead-Pierhead Line	54" dia. pre-stressed conc.	385	80-15[illegible]	115	*** [illegible]	[illegible]	Depth to rock increases sharply from east to west while uniformly increasing south to north.
	East of Bulkhead Line	14BP117 w/pts.	120	[illegible]	[illegible]	[illegible]	$1[illegible]	Deepest area is [illegible] St. - rock varies uniformly in both directions
[illegible] St.- [illegible] St.	Bulkhead - 400' East of pier-head	54" dia. pre-stressed conc.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Depth to rock rapidly increases from east to west
	400' East of Pierhead - Bulkhead	36" dia. pre-stressed conc.	200	150	150	** $28.[illegible]	$[illegible].00	Deepest part of gorge area - piles designed to carry load in friction
	East of Bulkhead	14BP117 w/pts.	120	85-95	90	$16.[illegible]	$1[illegible].00	Pile lengths do not vary significantly within segment
22nd St. [illegible]th St.	100' Either side of bulk-head line	54" dia. pre-stressed conc.	385	150-180	165	*** $45.00	$1[illegible].0	Obstructions to pile driving may be encountered
	100' west of bulkhead to pierhead	36" dia. pre-stressed conc.	200	150	150	*** $28.0[illegible]	$2[illegible].00	Gorge area - piles designed to carry load in friction
	100' east of bulkhead to western limit	14BP117 w/pts.	120	135-140	125	$1[illegible]	$15.[illegible]	Pile length uniformly increases east to west
[illegible]4th St. - 42nd St. *	Bulkhead to pierhead	54" dia. pre-stressed conc.	385	70-180	130	*** $45.00	$1[illegible]	Pile length uniformly increases east to west and decreases south to north
	East of bulkhead	14BP117 w/pts.	120	45-105	75	$16.0[illegible]	$1[illegible]	Pile length uniformly increases east to west and decreases south to north

NOTES

* Special treatment required around major existing buried structures.

** Pile lengths measured from [illegible] surface or existing [illegible] surface.

*** Costs do not include steel pile points which may be required for penetrating obstructions or embedment in sloping rock surface. These estimated costs per pile are [illegible] for [illegible] pile; [illegible] for [illegible] pile

**** Pile driving operations on all land based alternates may be expected to encounter numerous utilities and obstructions.

***** Except as noted under "Remarks", all pile foundations extend to end bearing on Gray or Brown glacial till or ledge rock.

PREPARED BY

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CHECKED BY B. E. Butler

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
BUREAU OF SOIL MECHANICS

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42 ND STREET BOROUGH OF MANHATTAN
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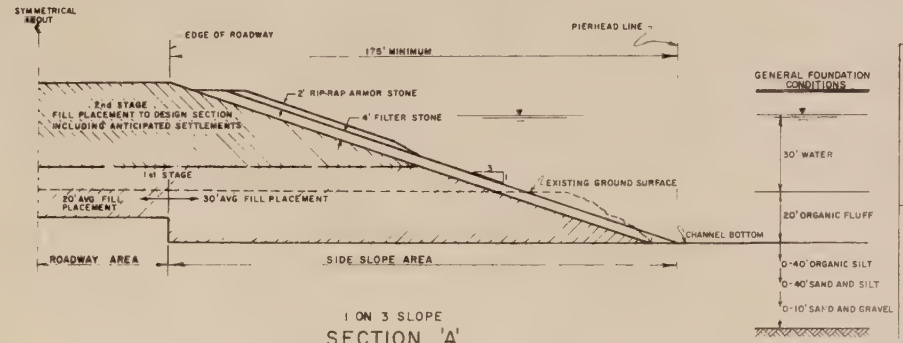
PILE ANALYSIS SUMMARY

APPROVED 10/13 1972
Wm. P. Hofmann
DIRECTOR

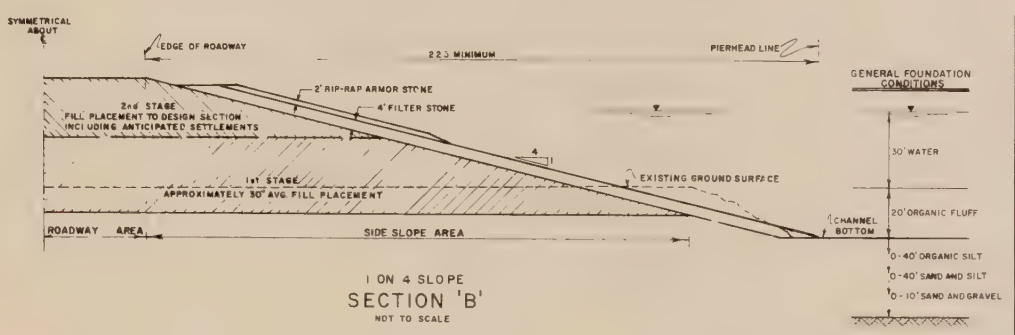
DISTRICT NO. 10
COUNTY NEW YORK

DWG NO 10 SM 1841



1 ON 3 SLOPE
SECTION 'A'
NOT TO SCALE

	Item	Estimated Limits	Unit Costs	Cost Estimate Per Station	Estimated Performance
SIDE SLOPE AREA	Unclassified Excavation	20' Avg. Removal	$3.50/yd³-disposal ? sea	$\left[\frac{128+89}{2}(20)\right]\frac{100}{27}\times 3.50=$ $41,300	
	Fill	Includes Anticipated 6" Avg. Settlement	$2.50/yd³	$\left[69\left(\frac{195}{2}\right)\right]\frac{100}{27}\times 2.50=$ $60,400	
	Rip-Rap Armor Stone Filter Stone	Slope for Channel side only 80' along slope 180' along slope	[illegible] yd³ [illegible] yd³	$2\times 80\times\frac{100}{27}\times 45=$ $20,000 $4\times 180\times\frac{100}{27}\times 20=$ $33,400	
	SIDE SLOPE AREA			TOTAL WITH RIP-RAP $178,100 TOTAL WITHOUT RIP RAP $101,700	
ROADWAY AREA	Unclassified Excavation	1.' Avg. Removal	$2.50/yd³-disposal ? sea	Per Station Per Foot of Roadway Width $1\times 10\times\frac{100}{27}\times 3.50=$ $130	
	Fill	Includes Anticipated .2' Avg. Settlement	[illegible]	$1\times 65\times\frac{100}{27}\times 2.50=$ $600	[illegible] Inches Post Const. Settlement
	Pavement	[illegible] Typical Section	[illegible]		
	ROADWAY AREA TOTAL $730				



1 ON 4 SLOPE
SECTION 'B'
NOT TO SCALE

	Item	Estimated Limits	Unit Costs	Cost Estimates Per Station	Estimated Performance
SIDE SLOPE AREA	Unclassified Excavation	10' Avg. Removal	[illegible] -disposal ? sea	$\left[\frac{72+212}{2}(10)\right]\frac{100}{27}\times 3.50=$ $24,900	
	Fill	Includes Anticipated 6" Avg. Settlement	[illegible] yd³	$\left[59\left(\frac{212}{2}\right)\right]\frac{100}{27}\times 2.50=$ $58,000	
	Rip-Rap Armor Stone Filter Stone	Slope for Channel side only 80' along slope 200' along slope	[illegible] yd³ 120 yd³	$2\times 80\times\frac{100}{27}\times 45=$ $26,700 $4\times 200\times\frac{100}{27}\times 20=$ $59,[illegible]	
	SIDE SLOPE AREA			TOTAL WITH RIP-RAP $1[illegible] TOTAL WITHOUT RIP RAP $ 82,900	
ROADWAY AREA	Unclassified Excavation	[illegible] Avg. Removal	[illegible] yd³-disposal ? sea	Per Station Per Foot of Roadway Width $1\times 10\times\frac{100}{27}\times 3.50=$ $130	
	Fill	Includes Anticipated [illegible] Avg. Settlement	[illegible] yd³	$1\times 65\times\frac{100}{27}\times 2.50=$ $600	6-12 Inches Post Const. Settlement
	Pavement	[illegible] Typical Section	[illegible]		
	ROADWAY AREA TOTAL $730				

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET BOROUGH OF MANHATTAN
PIN 0024 11 111

PROPOSED EMBANKMENT SECTIONS

PREPARED BY: [illegible]
DRAWN BY J. J. [illegible]
CHECKED BY [illegible]

APPROVED [illegible] 19[illegible]
[illegible]
DIRECTOR

REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM 1838

would reduce the unit cost of unclassified excavation by $2.00 per cubic yard because disposal at sea of this material would not be required.

C. Depressed Roadway Design Study

Our study of depressed roadway foundation designs included three alternate methods of treatment: mass concrete slab and gravity walls, concrete slab and walls with pile tie-downs, and slurry trench walls. After analyzing these alternates we found that certain alternates could be effectively used in combination. A summary of the results of our analyses and accompanying cost estimates are shown on Drawing No. 10 SM 1843. This information and the following discussion provides the basis for comparing design alternates and preparing preliminary depressed roadway foundation designs.

Mass concrete slab and gravity walls appeared to be best suited for only shallow installations not requiring dewatering. Deeper installations would require extensive temporary sheeting and dewatering procedures besides requiring added mass to resist anticipated hydrostatic uplift pressures.

Concrete walls with a connecting roadway slab utilizing pile tie-downs incorporating anchors embedded into rock may be used to resist large uplift pressures. This system would be installed by driving sheet piling at the lateral limits of the depressed section to a prescribed depth below excavation level. The soil within the sheeting rows would then be excavated with the ground water maintained at original level to prevent bottom blow-out. When the excavation is completed to the prescribed depth, an adequate number of piles would be driven underwater to ledge rock. Rock anchors would be installed in piles bearing in rock to resist anticipated uplift pressures. Then a concrete slab would be tremied around the piles and allowed to set before dewatering and constructing the permanent concrete walls while using the existing sheeting as the back form. Interior bracing would be installed as governed by the sequence of construction. For pile lengths in excess of 100 feet, a mass concrete tremie slab would be more economical than the aforementioned tie-down system. Although the tie-down method is feasible, it is fraught with construction problems and does not appear to provide the economic benefits innerent in the slurry trench wall method.

The "slurry" method provides a permanent water-tight installation when the walls can be economically keyed into ledge rock. The major economy effected is the elimination of the temporary sheet piling which would be required in either of the above mentioned methods. Historically, the major difficulty in deep foundation construction in New York City has been the installation and safe maintenance of temporary sheet piling. If an adequate key into rock can be achieved for the slurry wall, the soil may be removed to design level with only a minimum of dewatering required. Construction may then proceed in the dry, provided an underdrain system is installed to remove the relatively small quantity of water expected from seepage. This construction technique was used with great success at the World Trade Center which is located within close proximity to the proposed West Side Highway Project. In addition, sand drains could be provided to locally relieve any excessive hydrostatic pressure caused by leakage through either the seal or badly fractured rock along the bottom.

If the rock surface is not within an economic depth, the slurry method may be used in combination with either the mass concrete method or tie-down method to permit dewatering and roadway construction in the dry. This combination system is detailed on Drawing No. 10 SM 1843.

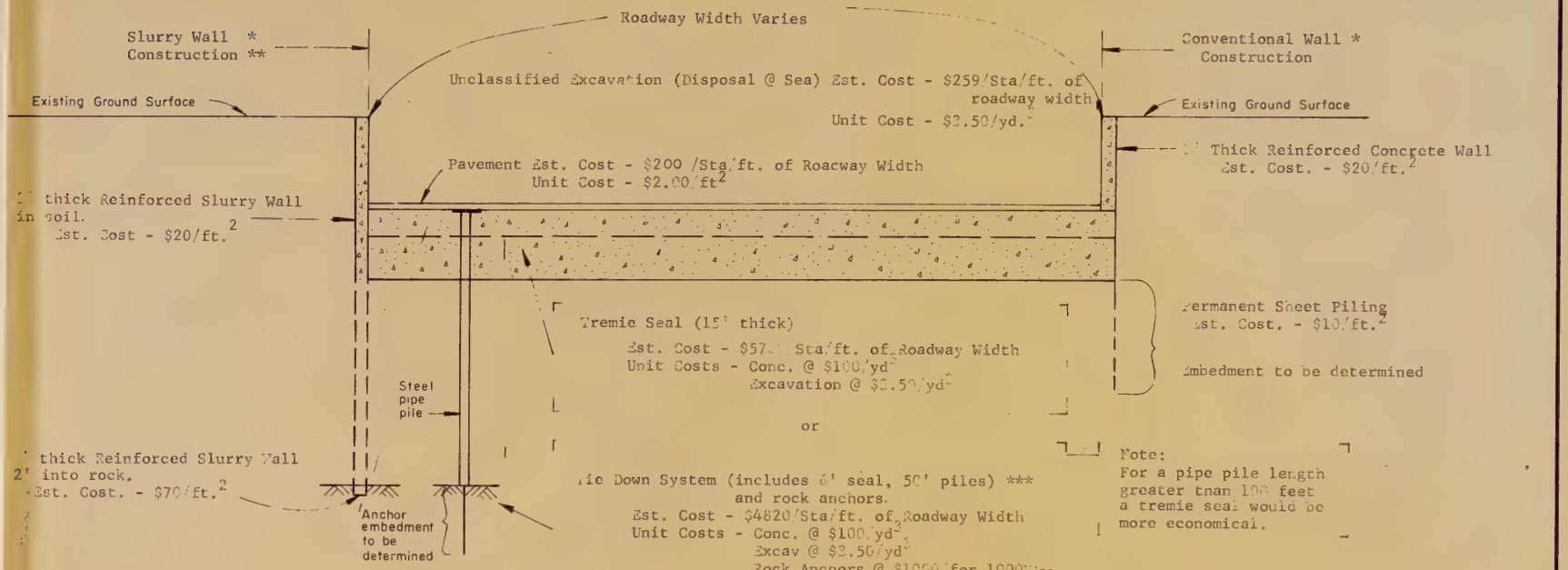
Depressed roadway sections which straddle or adjoin the existing bulkhead will require special treatment. Initially an embankment would have to be constructed adjacent to the existing bulkhead in accordance with Drawing No. 10 SM 1821. The end limit of the embankment surface would be extended at grade for a distance of approximately 20 feet beyond the outboard face of the slurry wall. This added width of embankment is required for the "slurry" equipment. Construction of a "slurry" wall could then proceed as outlined above.

FUTURE FOUNDATION INVESTIGATION AND DESIGN STUDIES

We have confined the feasibility study presented herein to the corridor bounded on the east by the existing West Side Highway and on the west by the pierhead line. More extensive alignment and interchange studies would only delay the submission of this report. At the present time, however, several additional borings have been completed by the Region 10 Soils Section in areas proposed for interchanges. In addition, a program of field permeability testing has been initiated to enable determination of dewatering criteria for depressed sections located on land. These permeability tests will be performed in both soil and rock deposits. The results from these additional explorations and tests will be made available when completed.

It is anticipated that certain alternate alignments will be selected for presentation at a public hearing. We will be available to provide additional input, as required to be used in the evaluations of these alternates. Upon their selection additional foundation design work may be required to refine the estimates contained in this report. However, we would not anticipate any problems in providing additional preliminary design information within the time remaining before the public hearing.

SUMMARY OF PRELIMINARY FOUNDATION DESIGN CRITERIA
DEPRESSED ROADWAY TREATMENT



1. Cost estimates do not include pumping costs for temporary dewatering or bracing system if necessary.
2. Cost estimates do not include facial treatment of walls.
3. Rock anchors may not be required where piles can develop uplift resistance in friction.

PREPARED BY
DRAWN BY
CHECKED BY

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
BUREAU OF SOIL MECHANICS

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY TO 42ND STREET, BOROUGH OF MANHATTAN
PIN 0024.11.111
DEPRESSED ROADWAY TREATMENT
SUMMARY

APPROVED 10/3 1972
DIRECTOR
DISTRICT NO. 10
COUNTY NEW YORK
DWG NO 10 SM 1843

A comprehensive subsurface explorations program in conjunction with an extensive laboratory and field testing program and an in-depth foundation design analysis will be required for final design of this project after the public hearing stage. This Bureau is prepared to undertake all of these tasks upon receipt of formal authorization to proceed.

APPENDIX

1. SOURCES OF SUBSURFACE INFORMATION

The following is the listing of all sources of subsurface information used for the preparation of drawings numbered [illegible] through [illegible]SM 1836. This information was acquired through this Department's Deputy Project Manager for the West Side Expressway Project. The prefix on the boring number refers to the particular source as follows:

Prefix	Source
A	Penn Central R.R. (Hudson Tubes)
B-1	Port Authority (George Washington Bridge)
B-2	Port Authority (Heliport @ 30th St.)
B-	Port Authority (World Trade Center)
B-4	Port Authority (Holland Tunnel)
B-5	Port Authority (Land Fill @ World Trade)
B-	Port Authority (Lincoln Tunnel)
B-7	Port Authority (Ocean Liner Terminal)
C-1	New York City Dept. of Public Works North River Water Pollution Control Project South Branch Sewer Contract 1 Bank St. to 5[illegible]th St.
C-2	Same as above-contract 2A 5[illegible]th St. to St. Clair PL
C-3	Same as above-contract 2B St. Clair PL. to Port Forebay
C-4	Same as above-contract [illegible] 1[illegible]2nd St. to 214 St.
D-	New York City Dept. of Public Works Borough of Manhattan, Newtown Creek P.C.P. South Branch Interceptor West Side, Clarkson St. to Battery Park
E-	New York City Dept. of Marine and Aviation New Pier 94 - North River Warren George - Boring Contractor
G-	New York City Dept. of Marine and Aviation Proposed Pier 4[illegible] - North River Holland America Lines, Roberts and Shaefer Consulting Engr., Warren George Boring Contractor
H-	New York City Dept. of Marine and Aviation New Piers 72-74-76 - North River Raymond International
J-	New York City - Dept. of Marine and Aviation Test Boring for Economic and Physical Survey and Study North River Waterfront Area Kennedy and Riegger Drilling Co., Inc.
K-	New York City Dept. of Marine and Aviation New Pier 37 - North River Madigan Hyland Engrs.
L-	Battery Park City Authority Pier 14 - Pier 16 Musser, Rutledge, Wentworth and Johnston Consulting Engineers
M-	New York State Dept. of Public Works Miller Highway - 1960's 57th St. to 72nd St. Hardesty and Hanover Consulting Engineers
N-	Index of Borings, Transportation Administration, Battery Park to 72nd St., New York City
P-	New York State Dept. of Transportation Miller Expressway 1972

2. DATUM NOTE

Elevation 300.00 has been arbitrarily established for this presentation as being equivalent to elevation 2.750 above mean sea level at Sandy Hook.

3. WATER LEVEL NOTES

a. The elevation of the river surface is arbitrarily shown at elevation 300 on the subsurface profiles for presentation purposes only.

b. Groundwater levels have not been indicated on the profiles for the Plan 'B' alignment since recorded water levels in the borings fluctuated over a wide range of depths. This is believed due to tidal variations.

4. SCALE NOTE

The scale of the Boring Location Plans are approximately 1" = 1[illegible]' before reduction. Any measurement to borings requiring accuracy within 2 percent should be referred to the original documents from which the borings were taken.

GENERAL CORRIDOR
Study Location
Battery Park to 42 nd St.
SCALE 1 : 24,000

LEGEND

Density (Non Plastic Soils)	Avg. No. of Blows per foot for 18 in. drop of 300 lb. hammer 2 in. O.D. Sampler
Very Loose	0-3
Loose	3-8
Medium Compact	8-20
Compact	20-35
Very Compact	over 35

Consistency (Plastic Soils)	
Very Soft	0-2
Soft	2-6
Firm	6-12
Stiff	12-20
Hard	over 20

Color
Br - Brown
Gr - Gray
Bk - Black
Rd - Red

Amount of Component Material
Primary Component Capitalized
"and" 50% to 40% of secondary component
"some" 40% to 10% "
"trace" 10% to less "

SYMBOLS

BORING LOCATION
WATER LEVEL
INTERPOLATED SOIL OR ROCK BOUNDARY
Soil Description
ASSUMED SOIL OR ROCK BOUNDARY
Soil Description
LEDGE ROCK

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

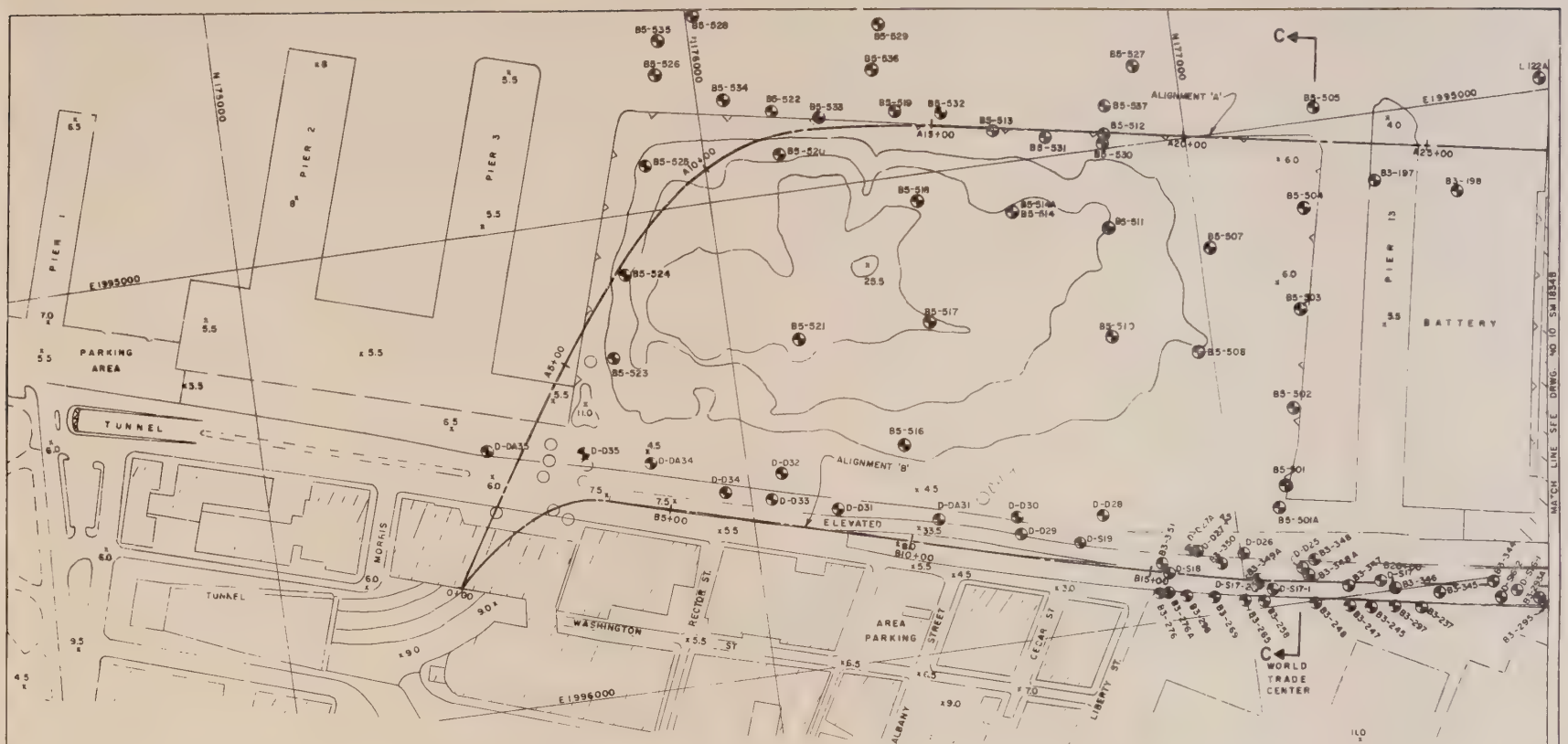
INTERSTATE ROUTE CONNECTION 510
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN C024 11 111

GENERAL NOTES

APPROVED [illegible] 1972
DIRECTOR

REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM 1834

PREPARED BY [illegible]
DRAWN BY
CHECKED BY [illegible]



PLAN

APPROX. SCALE: 1" = 100'

See Drawing No. 10SM 1834 for General Notes

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

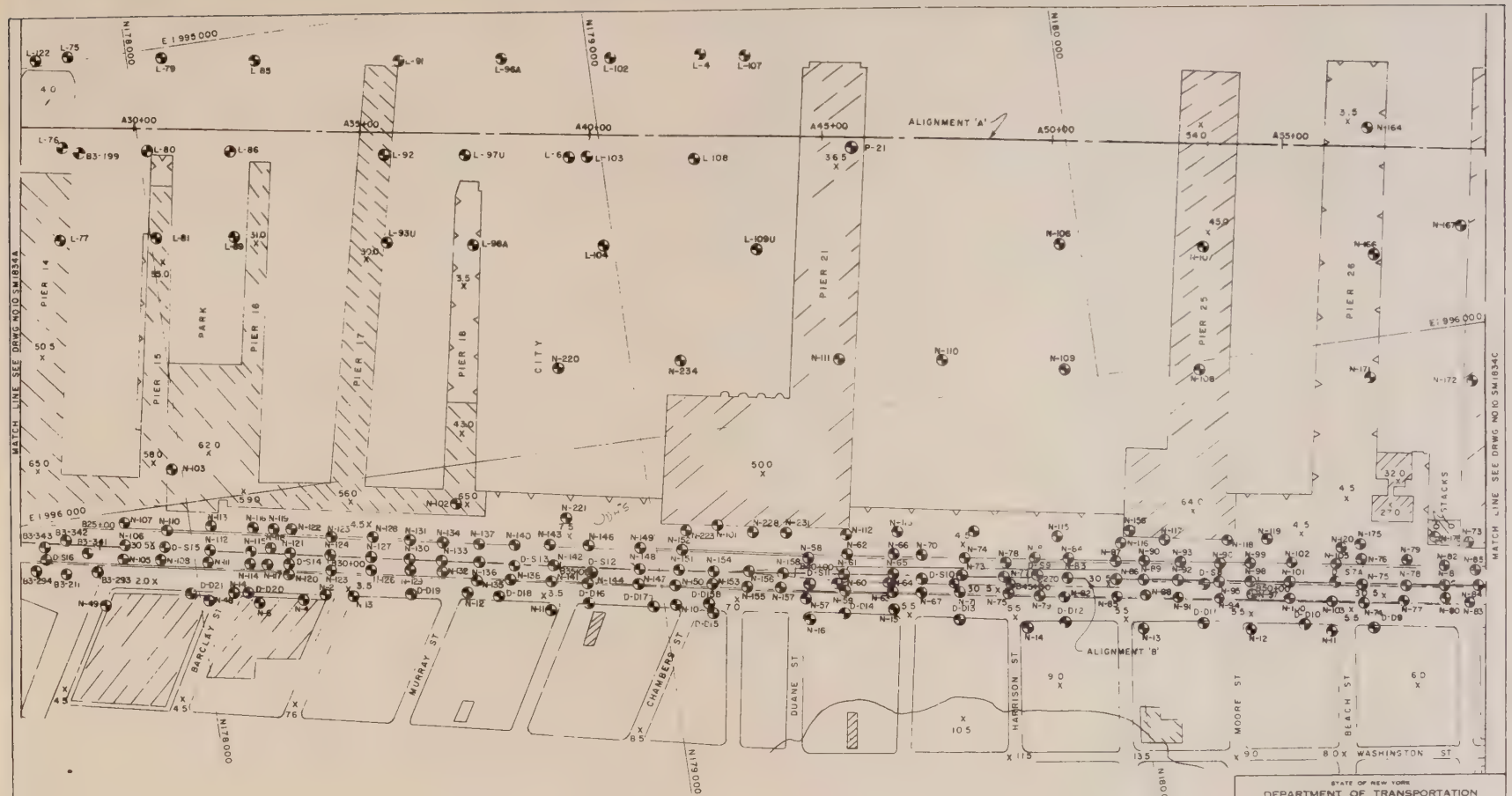
INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET BOROUGH OF MANHATTAN
PIN 0241.11.111

BORING LOCATION PLAN

PREPARED BY
DRAWN BY
CHECKED BY R.J. Cheney

APPROVED Oct. 11 1972
DIRECTOR

REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM 1834-A



PLAN

APPROX SCALE: 1" = 100'

See Drawing No. 10SM 1834 for General Notes

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

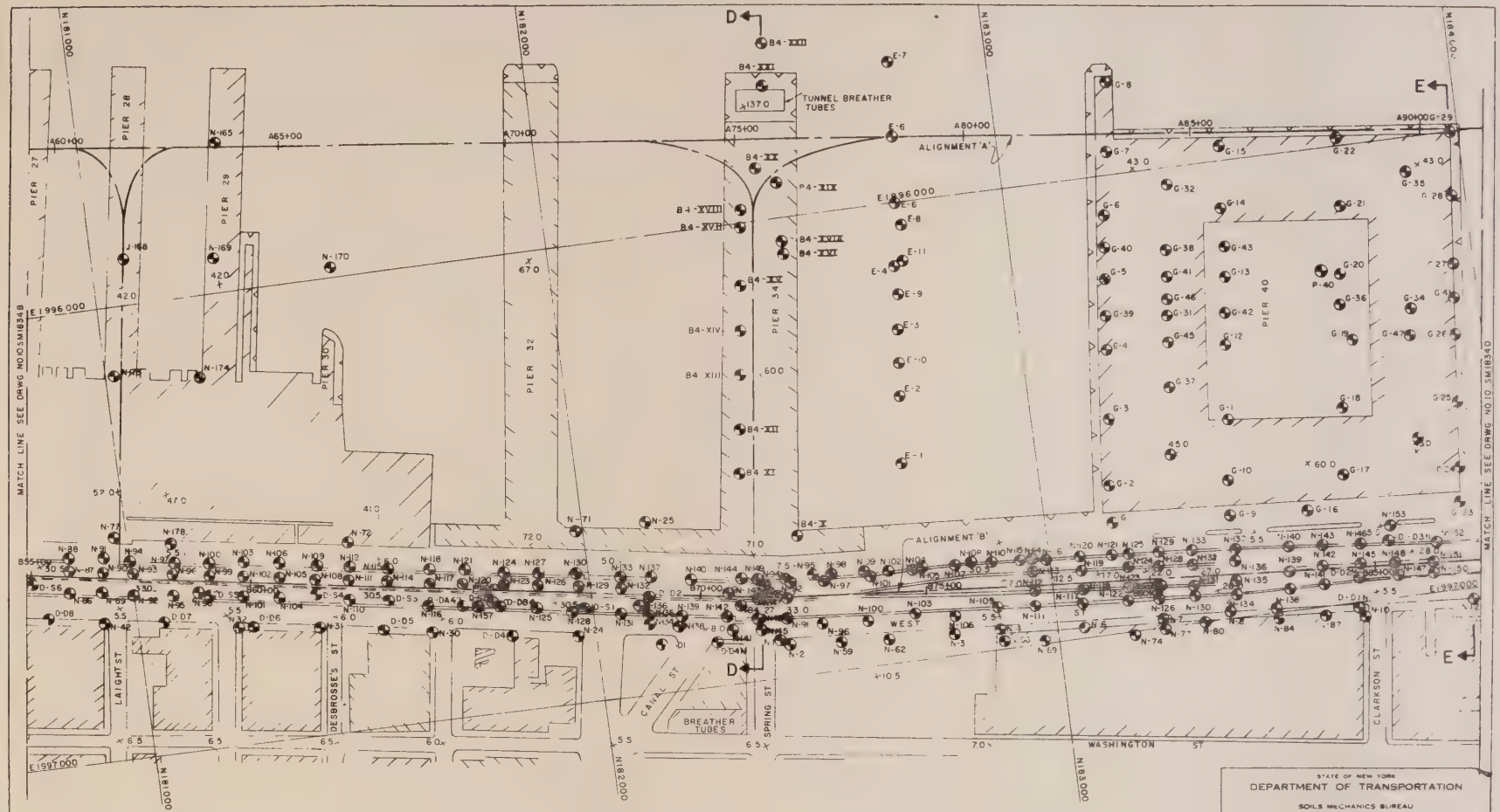
INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET BOROUGH OF MANHATTAN
PIN L024 11 111

BORING LOCATION PLAN

PREPARED BY [signature]
DRAWN BY N. Pulecini
CHECKED BY R. E. Cheney

APPROVED Oct. 11 1972
[signature]
DIRECTOR

REGION NO 0
COUNTY NEW YORK
DRAWING NO 10 SM 834 B



PLAN
APPROX SCALE 1" = 100'

See Drawing No. 10SM 1874 for General Notes

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

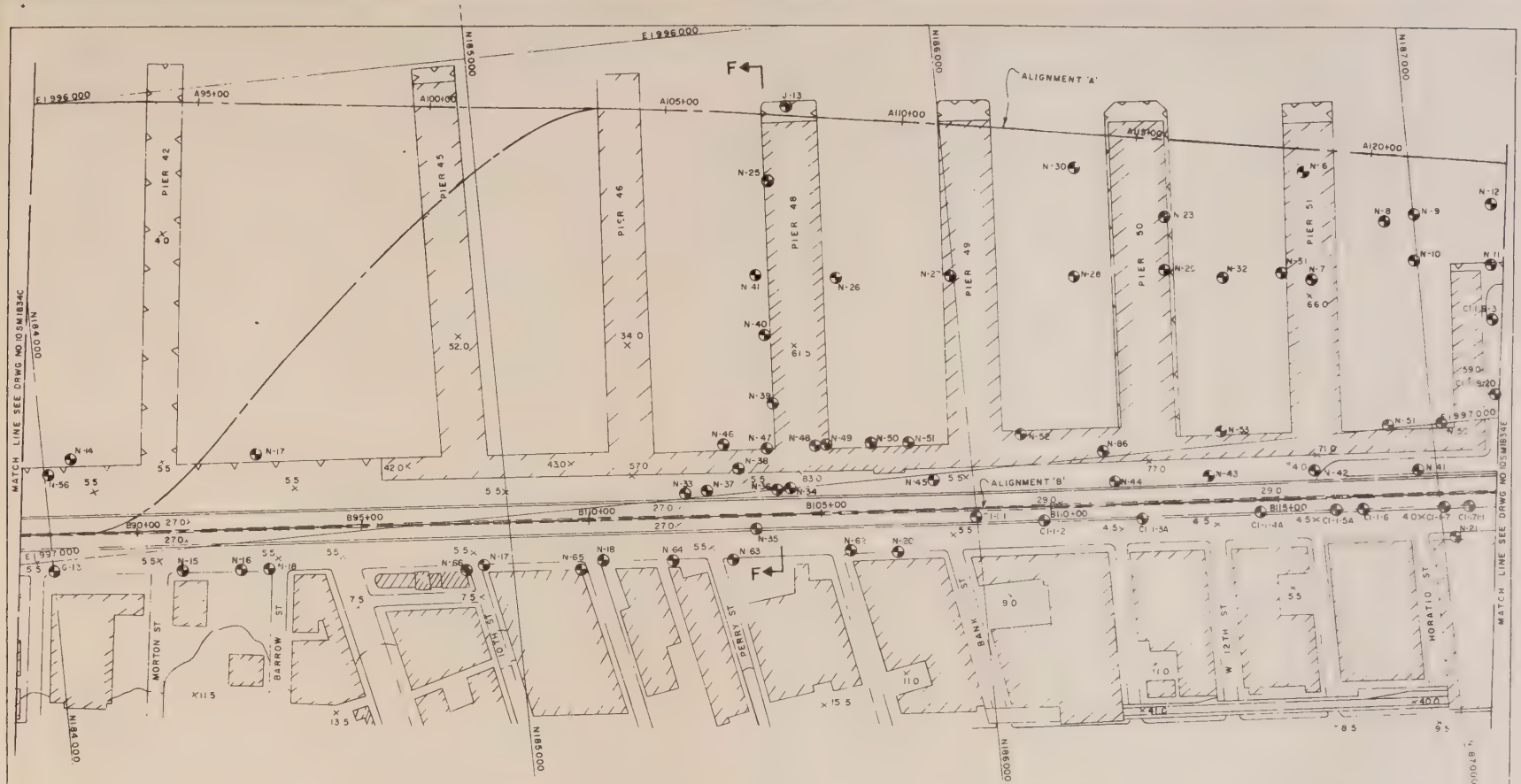
INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024 11 111

BORING LOCATION PLAN

PREPARED BY [signature]
DRAWN BY F. Agostino
CHECKED BY R S Cheney

APPROVED Oct 11 1972
[signature]
DIRECTOR

REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM 1834 C



PLAN
APPROX SCALE: 1" = 100'

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024 11 111

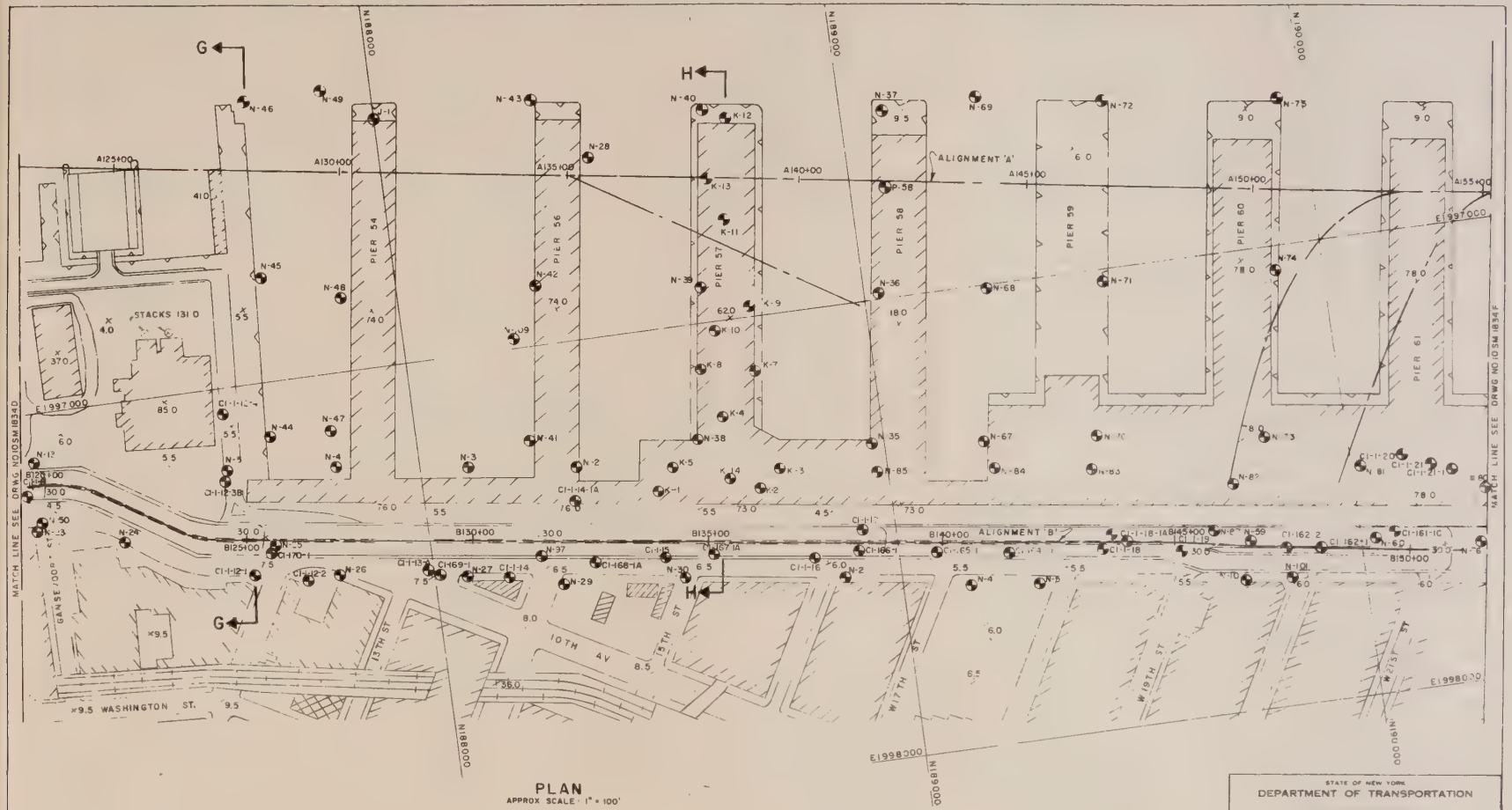
BORING LOCATION PLAN

See Drawing No. 10SM 18.. for Genera...

PREPARED BY [signature]
DRAWN BY J J Moni
CHECKED BY R S Cheney

APPROVED OCT 11 1972
[signature]
DIRECTOR

REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM 1834 D



PLAN
APPROX SCALE 1" = 100'

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024 11 111

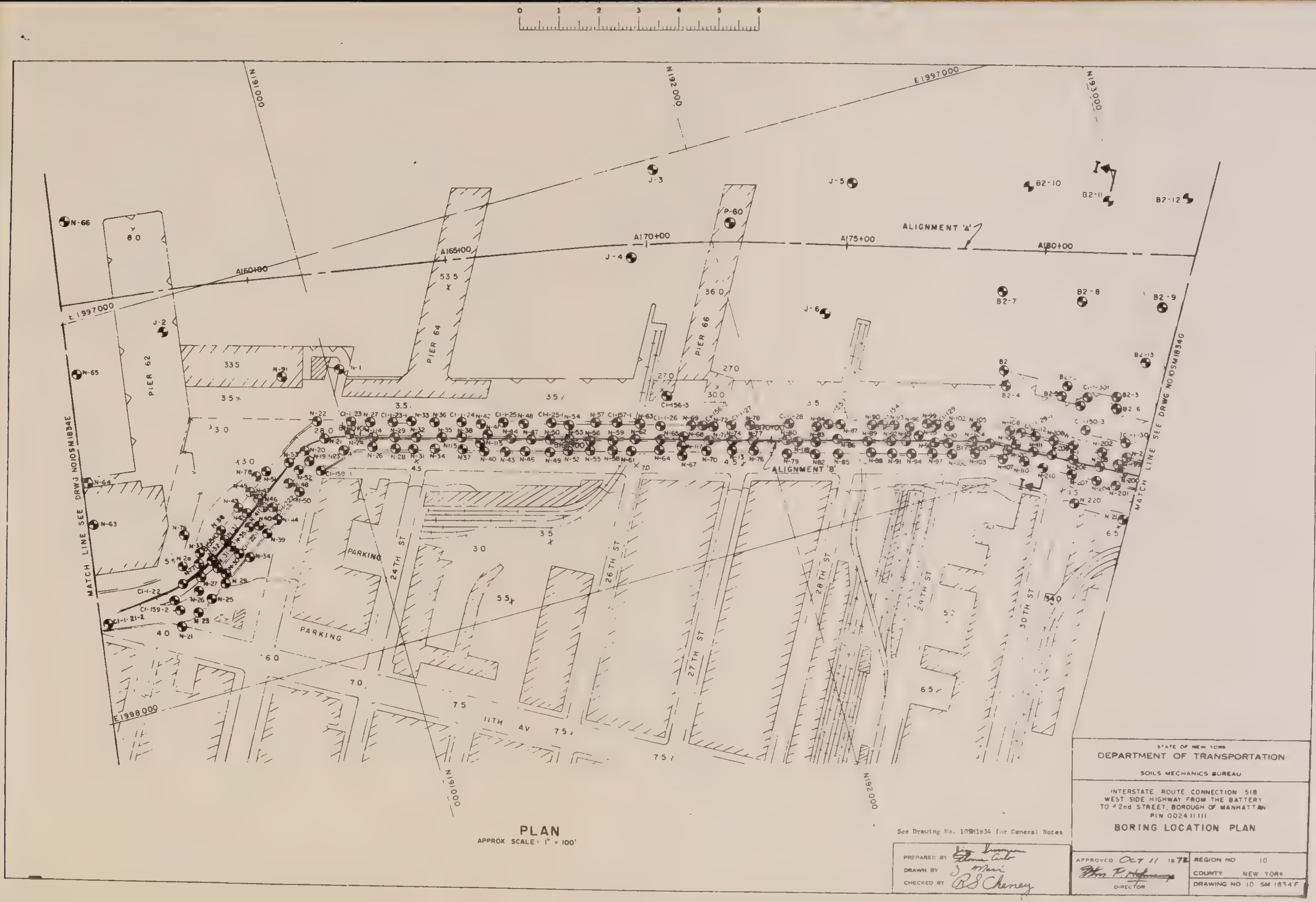
BORING LOCATION PLAN

See Drawing No. 10SM 1834 for General Notes

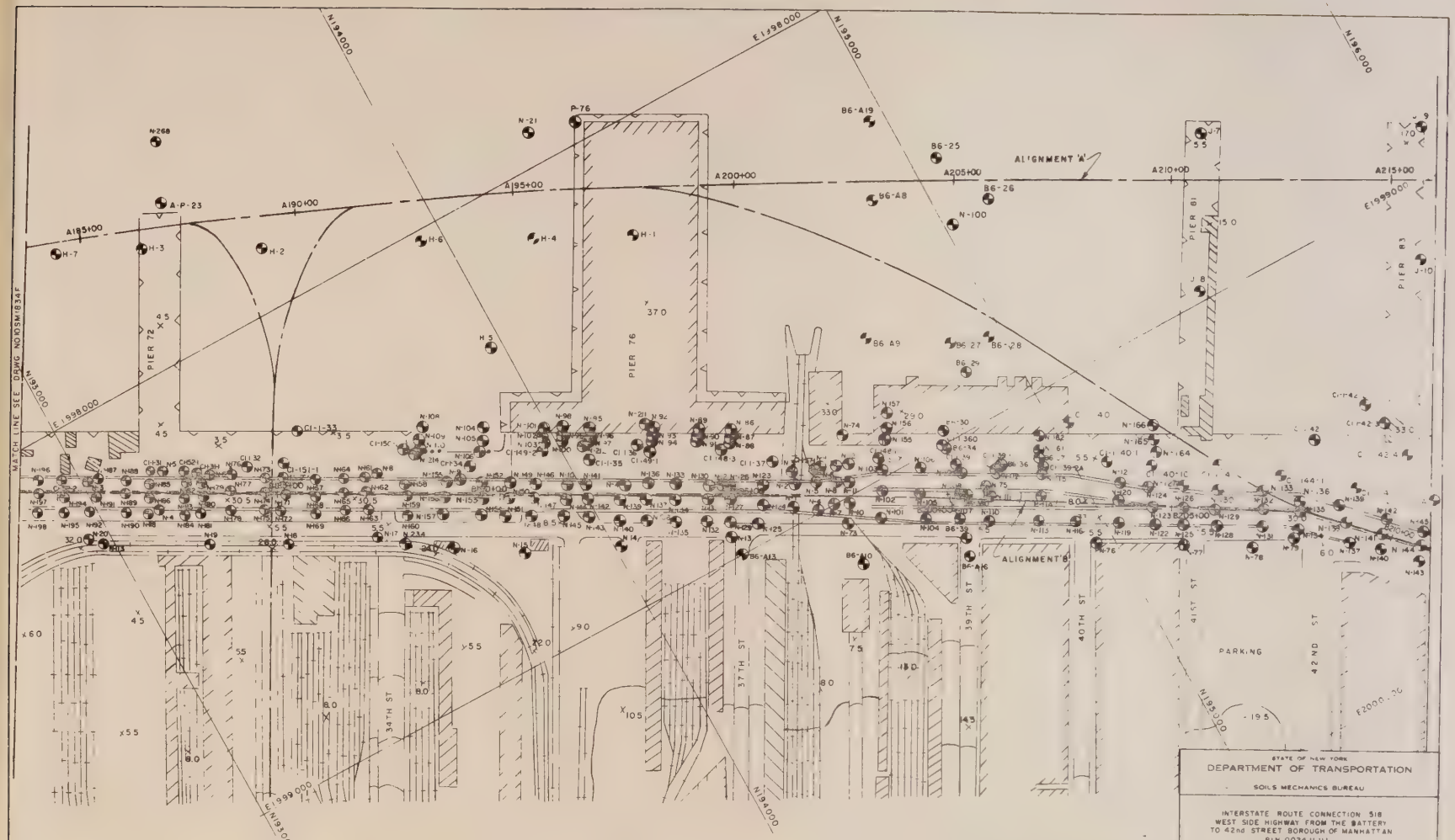
PREPARED BY
DRAWN BY
CHECKED BY R S Cheney

APPROVED Oct 11 1972
DIRECTOR

REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM 1834 E



0 1 2 3 4 5 6
N191000
N192000
N193000
E1997000
E1998000
A160+00
A165+00
A170+00
A175+00
A180+00
ALIGNMENT 'A'
ALIGNMENT 'B'
PIER 62
PIER 64
PIER 66
MATCH LINE SEE DRWG NO10SM1834E
MATCH LINE SEE DRWG NO10SM1834G
J-2
J-3
J-4
J-5
J-6
P-60
B2-7
B2-8
B2-9
B2-10
B2-11
B2-12
B2-13
N-66
N-65
N-64
N-63
N-1
N-22
CI-159-2
CI-1-22
CI-1-21-2
24TH ST
26TH ST
27TH ST
28TH ST
29TH ST
30TH ST
11TH AV
PARKING
PARKING
PLAN
APPROX SCALE: 1" = 100'
See Drawing No. 10SM1834 for General Notes
PREPARED BY
DRAWN BY
CHECKED BY
R.S. Cheney
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU
INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024 11 111
BORING LOCATION PLAN
APPROVED Oct 11 1972
DIRECTOR
REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM 1834 F



PLAN
APPROX SCALE 1" = 100'

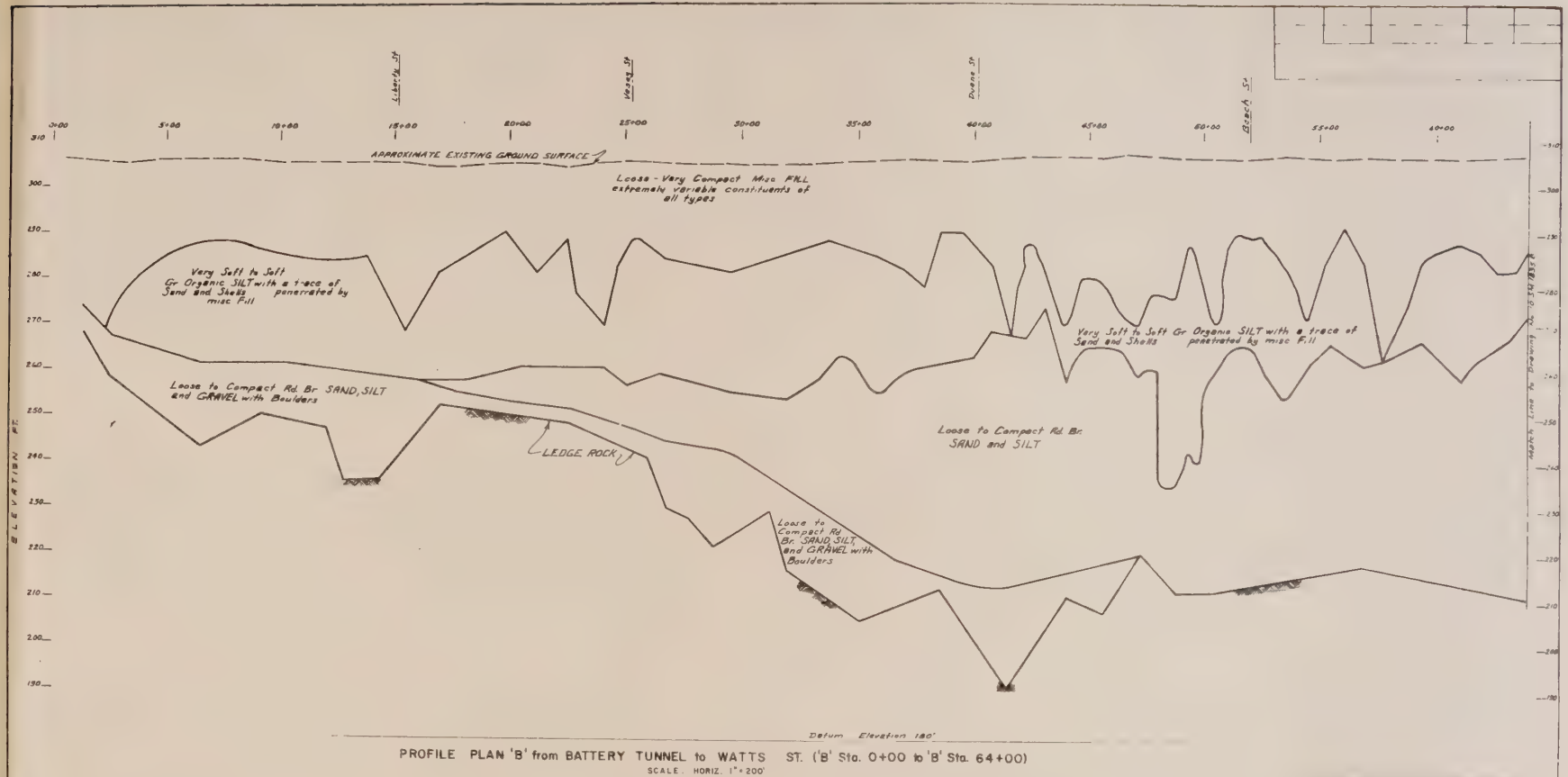
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET BOROUGH OF MANHATTAN
PIN 0024 11 111

BORING LOCATION PLAN

APPROVED Oct 11 1972
DIRECTOR

REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM 834 G



PROFILE PLAN 'B' from BATTERY TUNNEL to WATTS ST. ('B' Sta. 0+00 to 'B' Sta. 64+00)

SCALE. HORIZ. 1" = 200'
VERT 1" = 10'

GENERAL NOTES

The subsurface conditions shown hereon were transcribed from the sources noted on Drawing No. 10 SM 1834

1) General Soil Strata descriptions and indicated boundaries are based on interpretation of all available subsurface information and may not necessarily show the actual variation in subsurface conditions between borings and samples.

2) The observed water levels and/or conditions indicated on the soil profiles are as recorded at the time of drilling. These water levels and/or conditions may vary considerably, with time, according to the prevailing climate, rainfall and other factors.

3) Sound engineering judgement was exercised in preparing the subsurface information presented hereon. This information was prepared and is intended for State design purposes only. Its presentation on the plans or elsewhere is for the purpose of providing others with access to the identical information available to the State. This information is presented in good faith but is not intended as a substitute for personal investigation, interpretations or judgment of the Contractor.

PREPARED BY
DRAWN BY M. Palermo
CHECKED BY R.J. Cheney

LEGEND

The following tables summarize the descriptive information used on this profile.

Density (Non Plastic Soils)	Avg. No. of Blows per foot for 18 in. drop of 300 lb. hammer 2 in. O.D. sampler
Very Loose	0-3
Loose	3-8
Medium Compact	8-20
Compact	20-35
Very Compact	over 35

Consistency (Plastic Soils)	
Very Soft	0-2
Soft	2-6
Firm	6-12
Stiff	12-20
Hard	over 20

Amount of Component Material	
Primary Component Capitalized	
"and"	30% to 40% of secondary component
"some"	40% to 10% " " "
"trace"	10% to less " " "

Colors	
BR	Brown
Gr	Gray
Bk	Black
Rd	Red

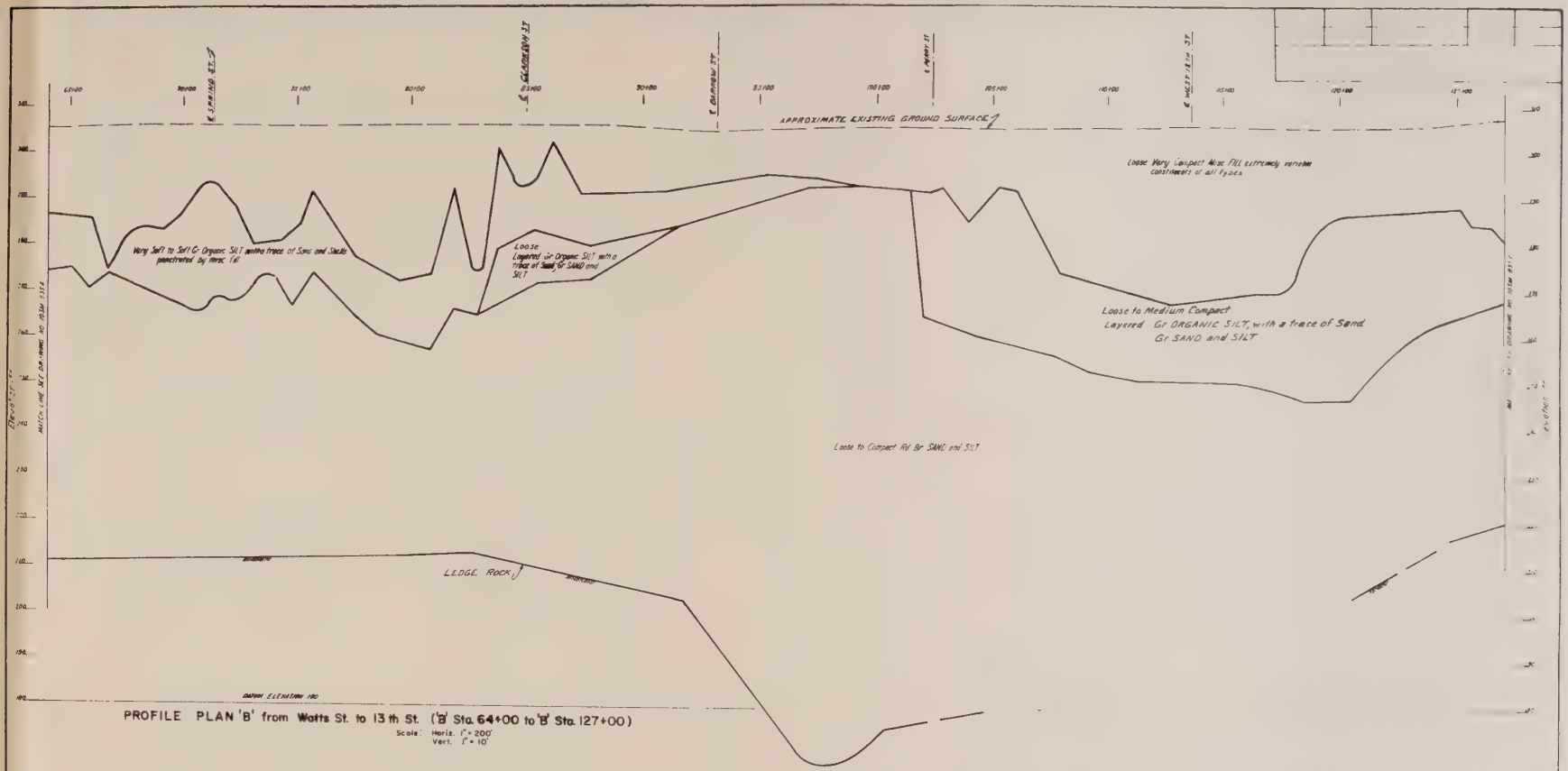
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024 11 111

GENERAL SUBSURFACE PROFILE ALONG EXISTING ALIGNMENT

APPROVED Sept 1, 1972
DIRECTOR

REGION NO. 10
COUNTY NEW YORK
DRAWING NO 10 SM 1835 A



PROFILE PLAN 'B' from Watts St. to 13th St. ('B' Sta. 64+00 to 'B' Sta. 127+00)

Scale: Horiz. 1" = 200'
Vert. 1" = 10'

See Drawing No. [illegible]

GENERAL NOTES

The subsurface conditions shown hereon were transcribed from the sources noted on Drawing No. 10 SM 1834

1) General Soil Strata descriptions and indicated boundaries are based on interpretation of all available subsurface information and may not necessarily show the actual variation in subsurface conditions between borings and samples.

2) The observed water levels and/or conditions indicated on the soil profiles are as recorded at the time of drilling. These water levels and/or conditions may vary considerably, with time, according to the prevailing climate, rainfall and other factors.

3) Sound engineering judgment was exercised in preparing the subsurface information presented hereon. This information was prepared and is intended for State design purposes only. Its presentation on the plans or elsewhere is for the purpose of providing others with access to the identical information available to the State. This information is presented in good faith but is not intended as a substitute for personal investigation, interpretations or judgment of the Contractor.

PREPARED BY [signature]
DRAWN BY D. Simmons
CHECKED BY R.S. Cheney

LEGEND

The following tables summarize the descriptive information used on this profile.

Density (Non Plastic Soils)	Avg. No. of Blows per foot for 18 in. drop of 300 lb. hammer 2 in. O.D. Sampler
Very Loose	0-3
Loose	3-8
Medium Compact	8-20
Compact	20-35
Very Compact	over 35

Consistency (Plastic Soils)	
Very Soft	0-2
Soft	2-4
Firm	4-8
Stiff	8-12
Hard	12-20
	over 20

Amount of Component Material

Primary Component Capitalized	
"and"	30% to 40% of secondary component
"some"	40% to 10% " " "
"trace"	10% to less " " "

Color	
BR - Brown	
Gr - Grey	
Bk - Black	
Rd - Red	

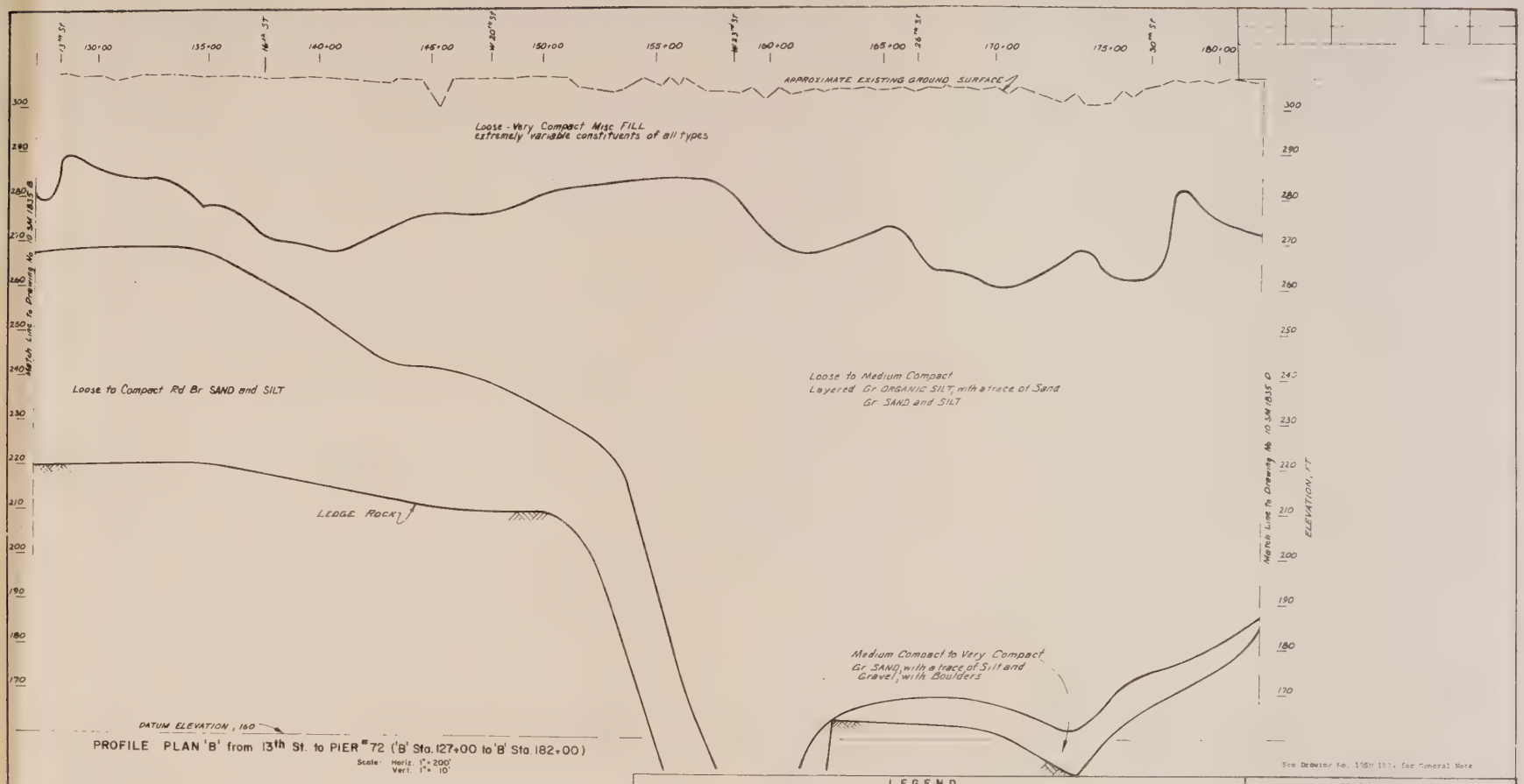
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024.11.111

GENERAL SUBSURFACE PROFILE
ALONG EXISTING ALIGNMENT

APPROVED Oct. 1, 1972
[signature]
DIRECTOR

REGION NO. 2
COUNTY NEW YORK
DRAWING NO. 10 SM 1835B



PROFILE PLAN 'B' from 13th St. to PIER #72 ('B' Sta. 127+00 to 'B' Sta. 182+00)

Scale: Horiz. 1" = 200'
Vert. 1" = 10'

See Drawing No. 10SM 1834 for General Note

GENERAL NOTES

The subsurface conditions shown hereon were transcribed from the sources noted on Drawing No. 10 SM 1834

1) General Soil Strata descriptions and indicated boundaries are based on interpretation of all available subsurface information and may not necessarily show the actual variation in subsurface conditions between borings and samples.

2) The observed water levels and/or conditions indicated on the soil profiles are as recorded at the time of drilling. These water levels and/or conditions may vary considerably, with time, according to the prevailing climate, rainfall and other factors.

3) Sound engineering judgment was exercised in preparing the subsurface information presented hereon. This information was prepared and is intended for State design purposes only. Its presentation on the plans or elsewhere is for the purpose of providing others with access to the identical information available to the State. This information is presented in good faith but is not intended as a substitute for personal investigation, interpretations or judgment of the Contractor.

PREPARED BY Jim Simmons
DRAWN BY F. Ogorton
CHECKED BY R S Cheney

LEGEND

The following tables summarize the descriptive information used on this profile.

Density (Non Plastic Soils)	Avg. No. of Blows per foot for 18 in. drop of 300 lb. hammer 2 in. O.D. Sampler
Very Loose	0-3
Loose	3-8
Medium Compact	8-20
Compact	20-35
Very Compact	over 35

Consistency (Plastic Soils)	
Very Soft	0-2
Soft	2-6
Firm	6-12
Stiff	12-20
Hard	over 20

Amount of Component Material		Color
Primary Component Capitalized		
"and"	50% to 40% of secondary component	BR - Brown
"some"	40% to 10% " " "	Gr - Gray
"trace"	10% to less " " "	Bk - Black
		Rd - Red

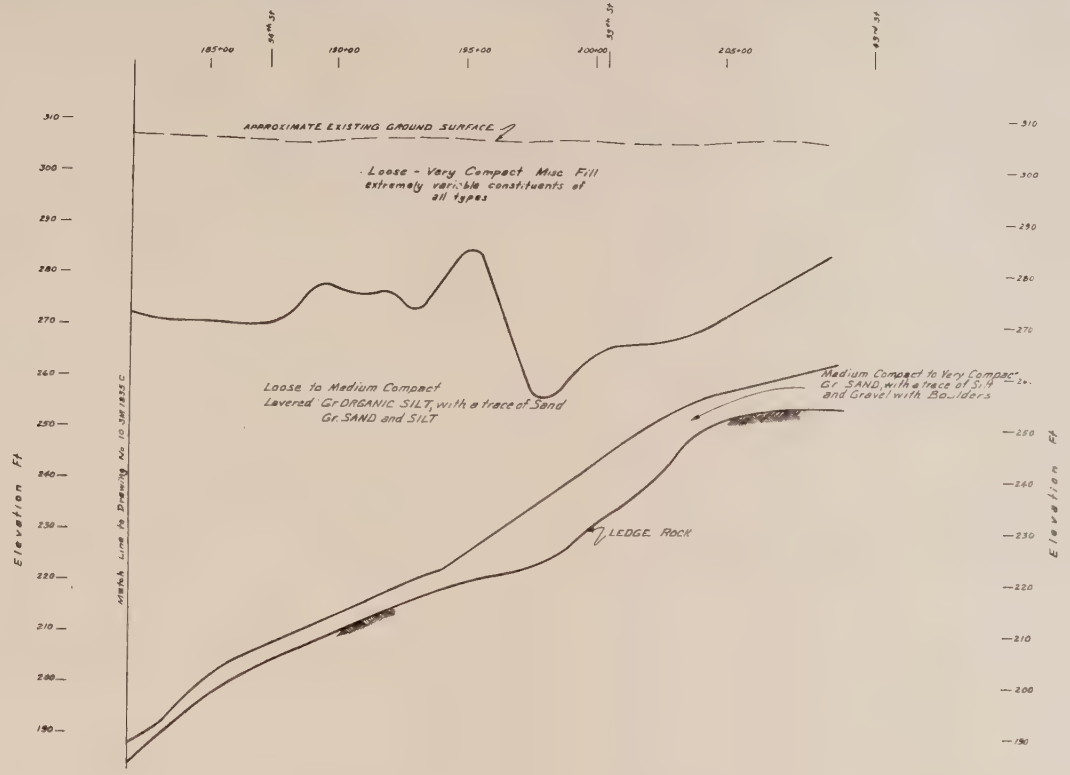
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024 11 111

GENERAL SUBSURFACE PROFILE
ALONG EXISTING ALIGNMENT

APPROVED Oct 11 1974
DIRECTOR

REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM 1835 C



PROFILE PLAN 'B' from Pier NO. 72 to 42 nd St. ('B' Sta. 182+00 to 'B' Sta. 210+00)

Scale Horiz 1"=200'
Vert 1"=10'

See Drawing No. 1-SM 1834 for General Notes

GENERAL NOTES

The subsurface conditions shown hereon were transcribed from the sources noted on Drawing No. 10 SM 1834

1) General Soil Strata descriptions and indicated boundaries are based on interpretation of all available subsurface information and may not necessarily show the actual variation in subsurface conditions between borings and samples.

2) The observed water levels and/or conditions indicated on the soil profiles are as recorded at the time of drilling. These water levels and/or conditions may vary considerably, with time, according to the prevailing climate, rainfall and other factors.

3) Sound engineering judgment was exercised in preparing the subsurface information presented hereon. This information was prepared and is intended for State design purposes only. Its presentation on the plans or elsewhere is for the purpose of providing others with access to the identical information available to the State. This information is presented in good faith but is not intended as a substitute for personal investigation, interpretations or judgment of the Contractor.

PREPARED BY [signature]
DRAWN BY [signature]
CHECKED BY R S Cheney

LEGEND

The following tables summarize the descriptive information used on this profile.

Density (Non Plastic Soils)	Avg No. of Blows per foot for 1¾ in. drop of 140 lb. hammer, 2 in. O.D. Sampler
Very Loose	0-3
Loose	3-8
Medium Compact	8-20
Compact	20-35
Very Compact	over 35
Consistency (Plastic Soils)	
Very Soft	0-2
Soft	2-6
Firm	6-12
Stiff	12-20
Hard	over 20

Amount of Component Material

Primary Component Capitalized

"and"	30% to 40% of secondary component
"some"	40% to 10% " - "
"trace"	10% to less " - "

Color	
Br	Brown
Gr	Gray
Bl	Black
Rd	Red

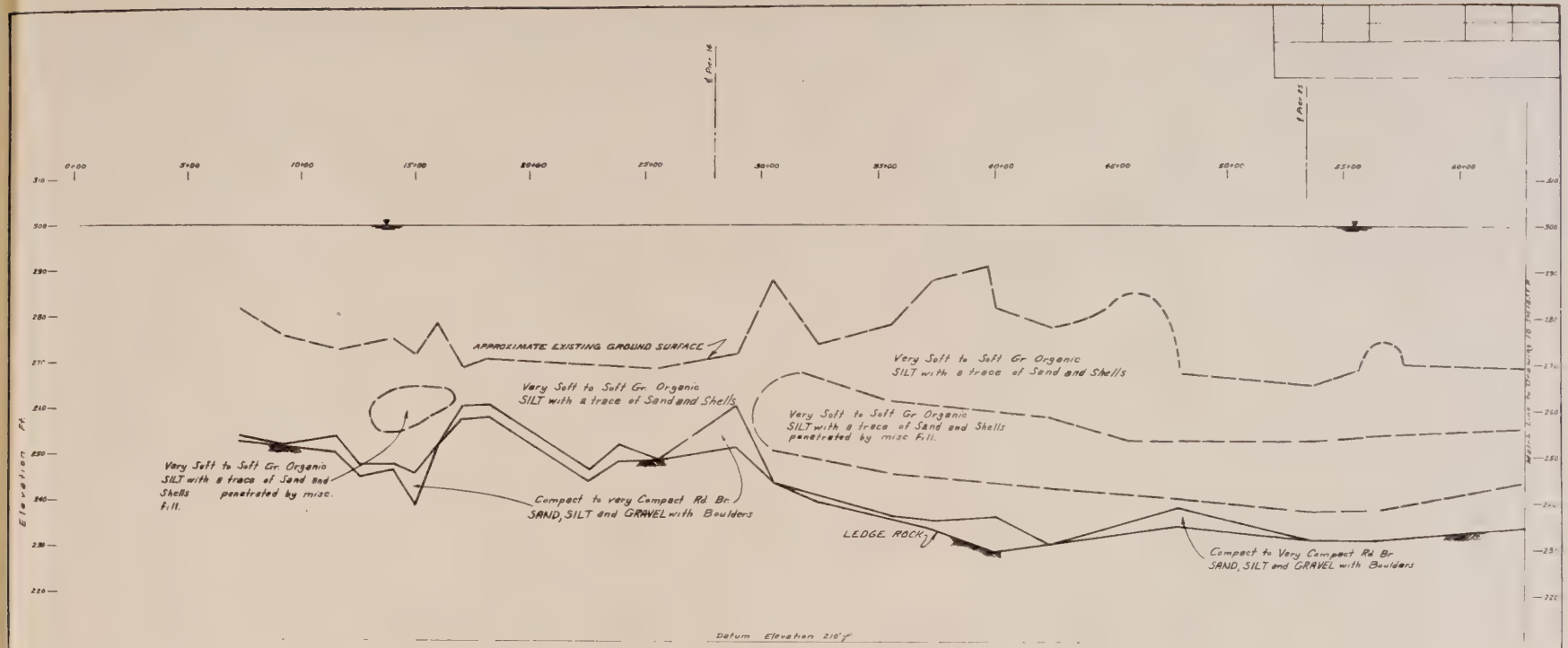
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0026.11111

GENERAL SUBSURFACE PROFILE ALONG EXISTING ALIGNMENT

APPROVED Oct 1 1972
[signature]
DIRECTOR

REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM 1835



PROFILE PLAN 'A' EAST OF PIERHEAD LINE from BATTERY TUNNEL TO PIER 28 ('A' STA. 0+00 TO 'A' STA. 63+00)

Scale Horiz 1"= 200'
Vert 1"= 10'

See Drawing No. 10SM 18.- for General Notes

GENERAL NOTES

The subsurface condition.. shown hereon were transcribed from the sources noted on Drawing No. 10 SM 1834

1) General Soil Strata descriptions and indicated boundaries are based on interpretation of all available subsurface information and may not necessarily show the actual variation in subsurface conditions between borings and samples.

2) The observed water levels and/or conditions indicated on the soil profiles are as recorded at the time of drilling. These water levels and/or conditions may very considerably, with time, according to the prevailing climate, rainfall and other factors.

3) Sound engineering judgment was exercised in preparing the subsurface information presented hereon. This information was prepared and is intended for State design purposes only. Its presentation on the plans or elsewhere is for the purpose of providing others with access to the identical information available to the State. This information is presented in good faith but is not intended as a substitute for personal investigation, interpretations or judgment of the Contractor.

PREPARED BY
DRAWN BY M Palermi
CHECKED BY RS Cheney

LEGEND

The following tables summarize the descriptive information used on this profile.

Density (Non Plastic Soils)	Avg. No. of Blows per foot for 18 in. drop of 300 lb. hammer 2 in. O.D. Sampler
Very Loose	0-3
Loose	3-8
Medium Compact	8-20
Compact	20-35
Very Compact	over 35
Consistency (Plastic Soils)	
Very Soft	0-2
Soft	2-6
Firm	6-12
Stiff	12-20
Hard	over 20

Amount of Component Material	
Primary Component Capitalized	
"and"	50% to 40% of secondary component
"some"	40% to 10% " " "
"trace"	10% to less " " "

Col r	
Br	- Brown
Gr	- Gray
Bk	- Black
Rd	- Red ,

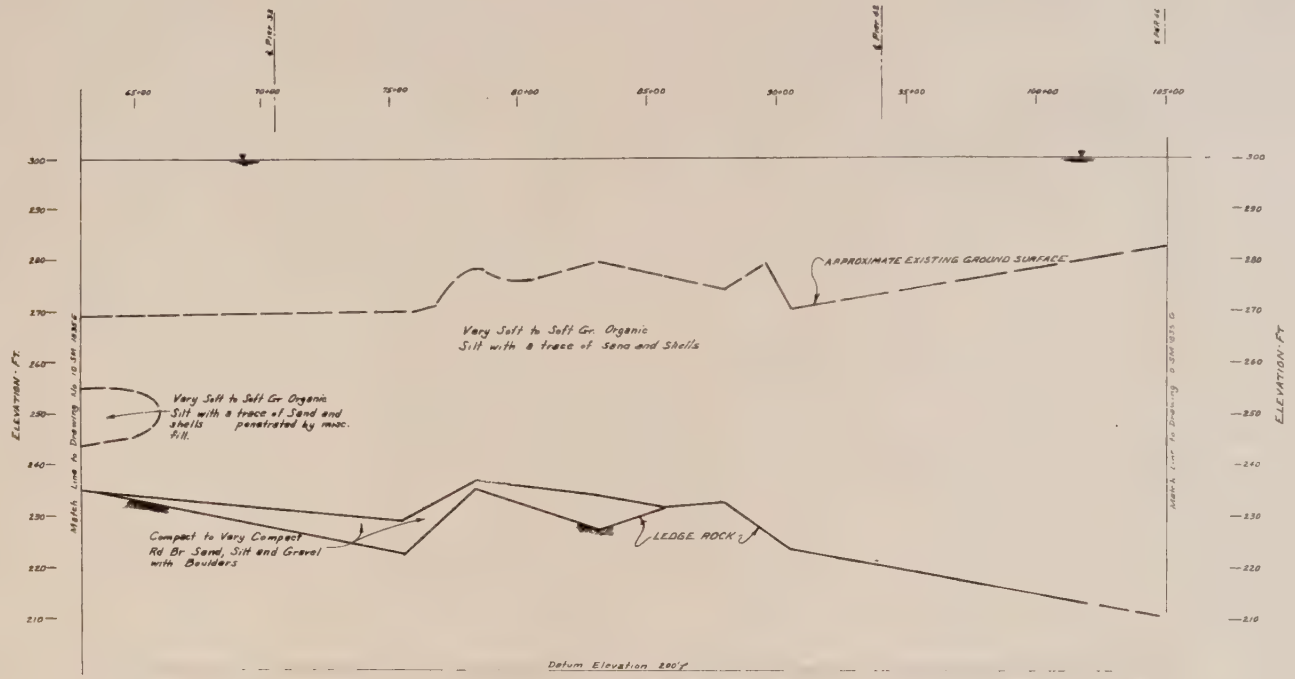
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024.11.111

GENERAL SUBSURFACE PROFILE
EAST OF PIERHEAD LINE

APPROVED Oct. 11 1972
DIRECTOR

REGION NO
COUNTY NEW YORK
DRAWING NO 10 SM 1835 E



PROFILE PLAN 'A' EAST OF PIERHEAD LINE FROM PIER 28 TO PIER 46 ('A' STA. 63+00 TO 'A' STA. 105+00)

Scale Horiz 1" = 200'
Vert 1" = 10'

See Drawing No. 10SM 1834 for [illegible]

The subsurface condition shown hereon were transcribed from the sources noted on Drawing No. 10 SM 1834

1) General Soil Strata descriptions and indicated boundaries are based on interpretation of all available subsurface information and may not necessarily show the actual variation in subsurface conditions between borings and samples.

2) The observed water levels and/or conditions indicated on the soil profiles are as recorded at the time of drilling. These water levels and/or conditions may vary considerably, with time, according to the prevailing climate, rainfall and other factors.

3) Sound engineering judgment was exercised in preparing the subsurface information presented hereon. This information was prepared and is intended for State design purposes only. Its presentation on the plans or elsewhere is for the purpose of providing others with access to the identical information available to the State. This information is presented in good faith but is not intended as a substitute for personal investigation, interpretations or judgment of the Contractor.

PREPARED BY [signature]
DRAWN BY [signature]
CHECKED BY R. J. Cheney

LEGEND

The following tables summarize the descriptive information used on this profile.

Density (Non Plastic Soils)	Avg. No. of Blows per foot for 18 in. drop of 300 lb. hammer 2 in. O.D. Sampler
Very Loose	0-3
Loose	3-8
Medium Compact	8-20
Compact	20-35
Very Compact	over 35

Consistency (Plastic Soils)	
Very Soft	0-2
Soft	2-6
Firm	6-12
Stiff	12-20
Hard	over 20

Amount of Component Material	
Primary Component Capitalized	
"and"	50% to 40% of secondary component
"some"	40% to 10% " " "
"trace"	10% to less " " "

Color

[illegible]

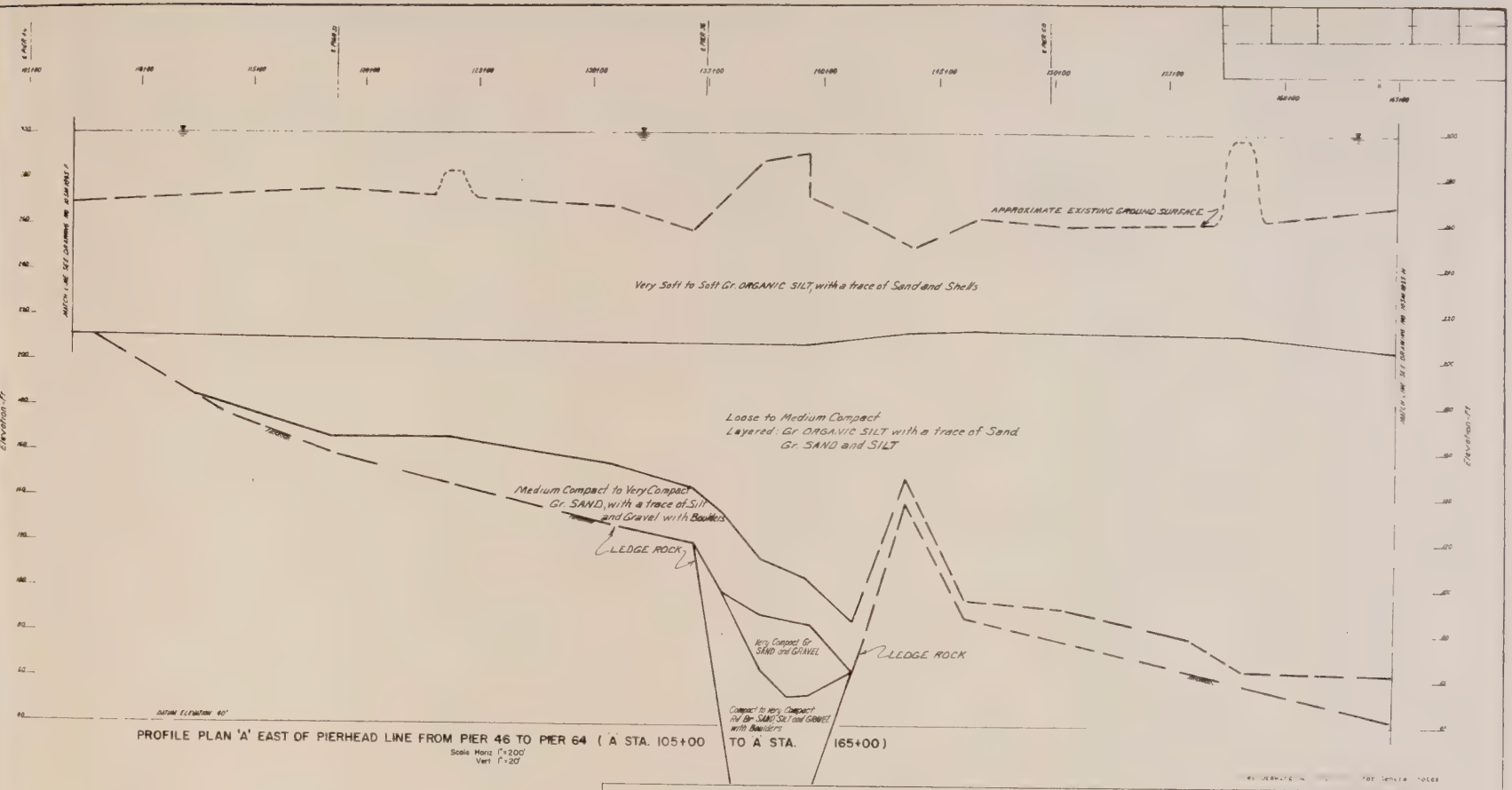
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET BOROUGH OF MANHATTAN
PIN 0024 11 111

GENERAL SUBSURFACE PROFILE
EAST OF PIERHEAD LINE

APPROVED Oct 11 1972
[signature]
DIRECTOR

REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM [illegible]



PROFILE PLAN 'A' EAST OF PIERHEAD LINE FROM PIER 46 TO PIER 64 (A STA. 105+00 TO A STA. 165+00)

Scale Horiz 1"=200'
Vert 1"=20'

GENERAL NOTES

The subsurface conditions shown hereon were transcribed from the sources noted on Drawing No. 10 SM 1834

1) General Soil Strata descriptions and indicated boundaries are based on interpretation of all available subsurface information and may not necessarily show the actual variation in subsurface conditions between borings and samples.

2) The observed water levels and/or conditions indicated on the soil profiles are as recorded at the time of drilling. These water levels and/or conditions may very considerably, with time, according to the prevailing climate, rainfall and other factors.

3) Sound engineering judgment was exercised in preparing the subsurface information presented hereon. This information was prepared and is intended for State design purposes only. Its presentation on the plans or elsewhere is for the purpose of providing others with access to the identical information available to the State. This information is presented in good faith but is not intended as a substitute for personal investigation, interpretations or judgment of the Contractor.

PREPARED BY
DRAWN BY
CHECKED BY

LEGEND

The following tables summarize the descriptive information used on this profile.

Density (Non Plastic Soils)	Avg. No. of Blows per foot for 18 in. drop of 140 lb hammer - 2 in. O.D. Sampler
Very Loose	0-3
Loose	3-8
Medium Compact	8-20
Compact	20-35
Very Compact	over 35

Consistency (Plastic Soils)	
Very Soft	0-2
Soft	2-6
Firm	6-12
Stiff	12-20
Hard	over 20

Amount of Component Material	
Primary Component Capitalized	
"and"	50% to 40% of secondary component
"some"	40% to 10% " " "
"trace"	10% to less " " "

Color	
BR	Brown
GY	Gray
BK	Black
RD	Red

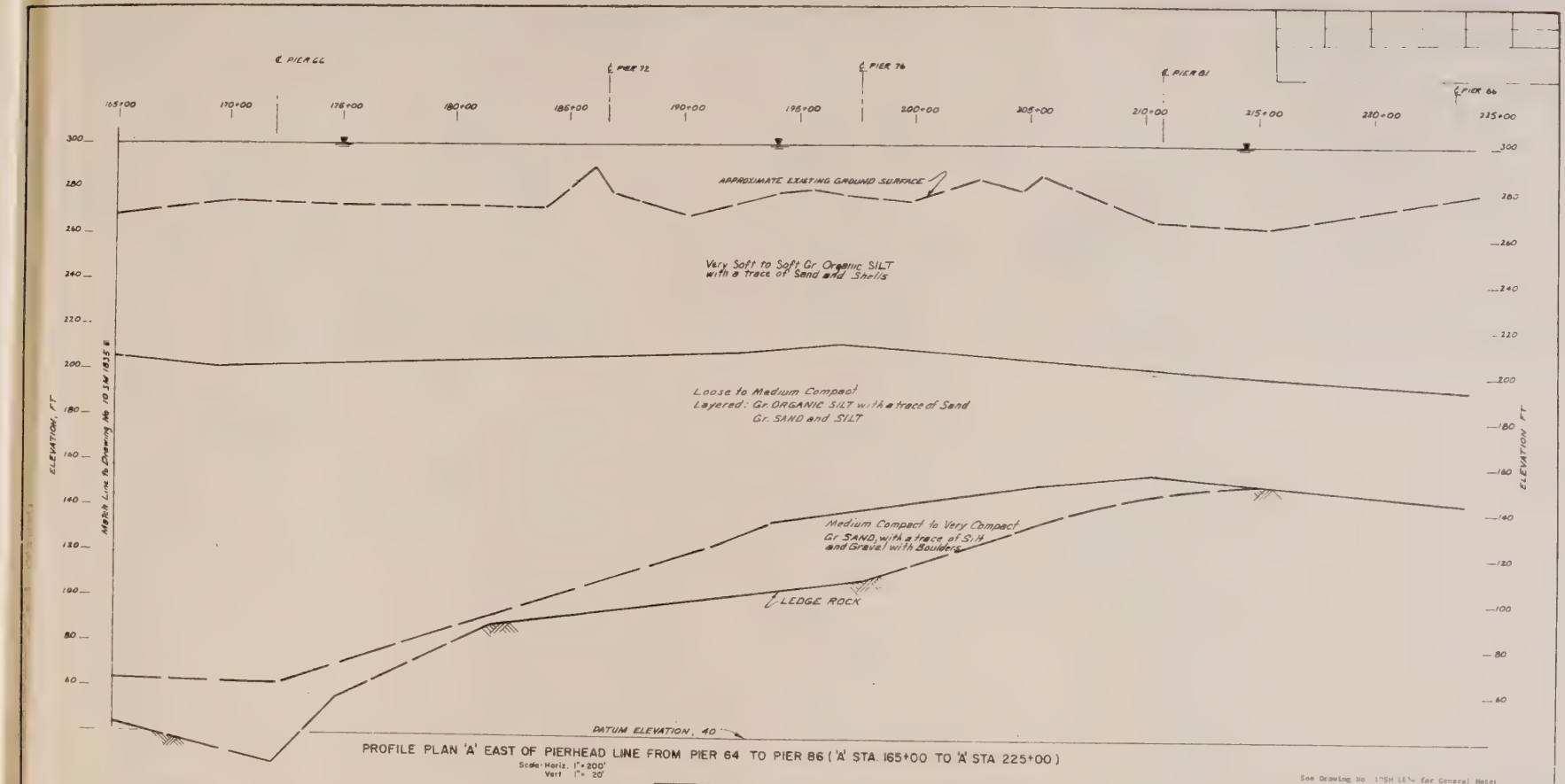
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024 11 111

GENERAL SUBSURFACE PROFILE
EAST OF PIERHEAD LINE

APPROVED Oct 11 1972
DIRECTOR

REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM 1850



PROFILE PLAN 'A' EAST OF PIERHEAD LINE FROM PIER 64 TO PIER 86 ('A' STA 165+00 TO 'A' STA 225+00)

Scale: Horiz. 1"=200'
Vert 1"= 20'

See Drawing No 10SM 1834 for General Notes

GENERAL NOTES

The subsurface information shown hereon were transcribed from the sources noted on Drawing No. 10 SM 1834

1) General Soil Strata descriptions and indicated boundaries are based on interpretation of all available subsurface information and may not necessarily show the actual variation in subsurface conditions between borings and samples.

2. The observed water levels and/or conditions indicated on the soil profiles are as recorded at the time of drilling. These water levels and/or conditions may vary considerably, with time, according to the prevailing climate, rainfall and other factors.

3) Sound engineering judgment was exercised in preparing the subsurface information presented hereon. This information was prepared and is intended for State design purposes only. Its presentation on the plans or elsewhere is for the purpose of providing others with access to the identical information available to the State. This information is presented in good faith but is not intended as a substitute for personal investigation, interpretations or judgment of the Contractor.

PREPARED BY [illegible]
DRAWN BY [illegible]
CHECKED BY R.J. Cheney

LEGEND

The following tables summarize the descriptive information used on this profile.

Density (Non Plastic Soils)	Avg. No. of Blows per foot for 18 in. drop of 140 lb. hammer 2 in. O.D. Sampler
Very Loose	0-3
Loose	3-8
Medium Compact	8-20
Compact	20-35
Very Compact	over 35

Consistency (Plastic Soils)	
Very Soft	0-2
Soft	2-6
Firm	6-12
Stiff	12-20
Hard	over 20

Amount of Component Material	
Primary Component Capitalized	
"and"	50% to 40% of secondary component
"some"	[illegible]
"trace"	10% to less

Soils	
BR	Brown
[illegible]	[illegible]
BL	Black
RD	Red

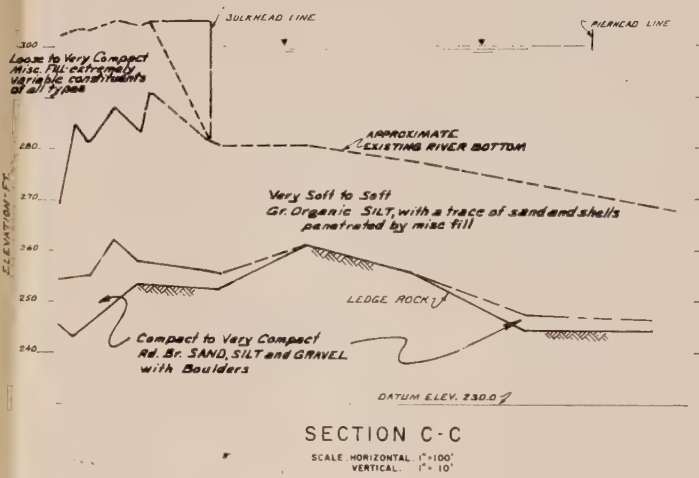
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024.11.111

GENERAL SUBSURFACE PROFILE
EAST OF PIERHEAD LINE

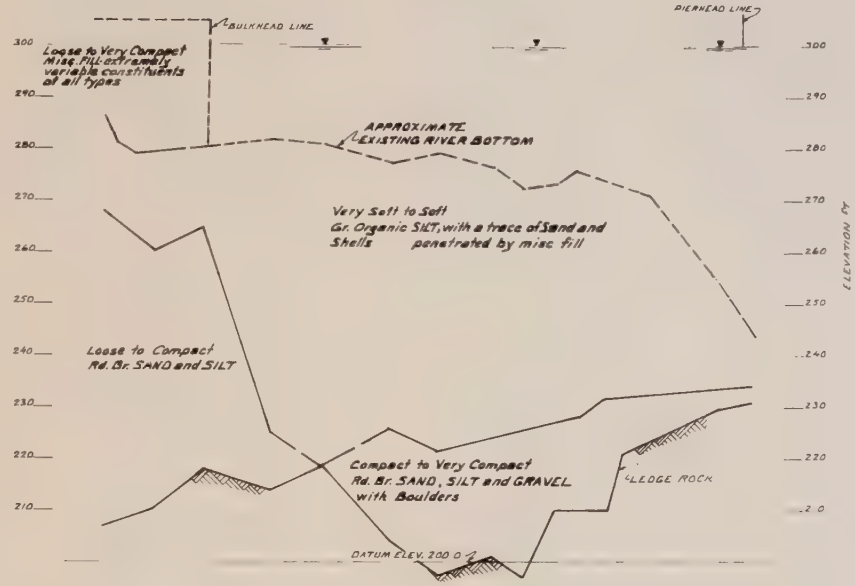
APPROVED OCT 1 1972
[illegible]
DIRECTOR

REGION NO. [illegible]
COUNTY NEW YORK
DRAWING NO. 10 SM 1835 M



SECTION C-C

SCALE HORIZONTAL 1"=100'
VERTICAL 1"= 10'



SECTION D-D

SCALE HORIZONTAL 1"=100'
VERTICAL 1"= 10'

See Drawing No. [illegible] for general notes

GENERAL NOTES

The subsurface conditions shown hereon were transcribed from the sources noted on Drawing No. 10 SM 1834

1) General Soil Strata descriptions and indicated boundaries are based on interpretation of all available subsurface information and may not necessarily show the actual variation in subsurface conditions between borings and samples.

2) The observed water levels and/or conditions indicated on the soil profiles are as recorded at the time of drilling. These water levels and/or conditions may vary considerably, with time, according to the prevailing climate, rainfall and other factors.

3) Sound engineering judgment was exercised in preparing the subsurface information presented hereon. This information was prepared and is intended for State design purposes only. Its presentation on the plans or elsewhere is for the purpose of providing others with access to the identical information available to the State. This information is presented in good faith but is not intended as a substitute for personal investigation, interpretations or judgment of the Contractor.

PREPARED BY [signature]
DRAWN BY J.J. Moan
CHECKED BY Rod Cheney

LEGEND

The following tables summarize the descriptive information used on this profile.

Density (Non Plastic Soils)	Avg. No. of Blows per foot for 18 in. drop of 300 lb. hammer 2 in. O.D. Sampler
Very Loose	0-3
Loose	3-8
Medium Compact	8-20
Compact	20-35
Very Compact	over 35

Consistency (Plastic Soils)	
Very Soft	0-2
Soft	2-6
Firm	6-12
Stiff	12-20
Hard	over 20

Amount of Component Material	Component Capitalized	Color
Primary		BR - Brown
"and"	50% to 40% of secondary component	Gr - Gray
"some"	40% to 10% " " "	Bk - Black
"trace"	10% to less " " "	Rd - Red

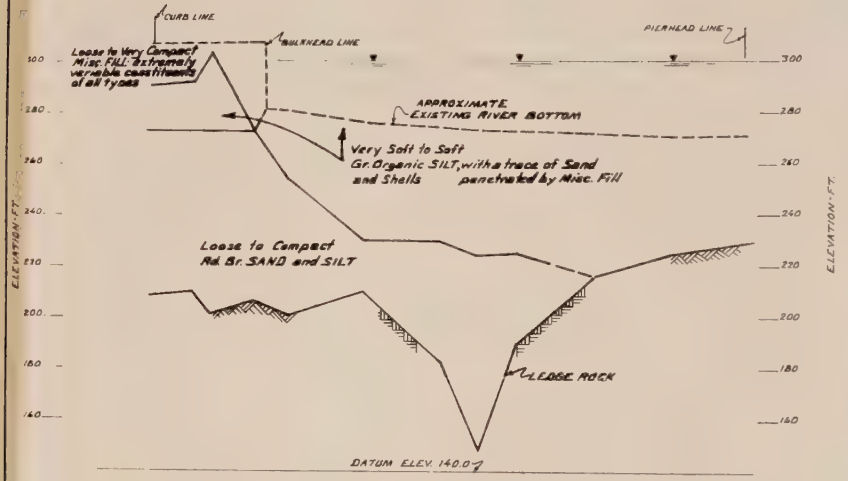
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024.11.111

GENERAL SUBSURFACE SECTIONS C-C AND D-D

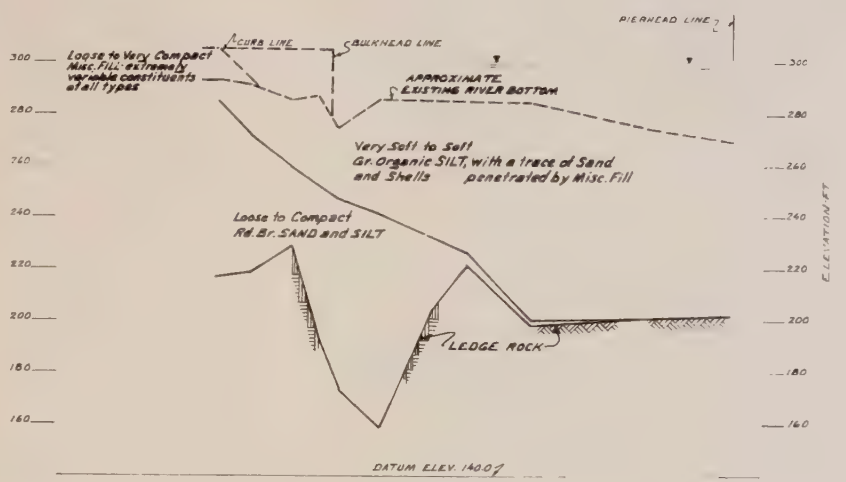
APPROVED Oct 11 1972
[signature]
DIRECTOR

REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM 1838 I



SECTION E-E

SCALE. HORIZONTAL: 1" = 100'
VERTICAL. 1" = 20'



SECTION F-F

SCALE HORIZONTAL: 1" = 100'
VERTICAL. 1" = 20'

See Drawing No. [illegible] for General Notes

GENERAL NOTES

The subsurface conditions shown hereon were transcribed from the sources noted on Drawing No. 10 SM 1834

1) General Soil Strata descriptions and indicated boundaries are based on interpretation of all available subsurface information and may not necessarily show the actual variation in subsurface conditions between borings and samples.

2) The observed water levels and/or conditions indicated on the soil profiles are as recorded at the time of drilling. These water levels and/or conditions may vary considerably, with time, according to the prevailing climate, rainfall and other factors.

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PREPARED BY [signature]
DRAWN BY [signature]
CHECKED BY Rd Cheney

LEGEND

The following tables summarize the descriptive information used on this profile.

Density (Non Plastic Soils)	Avg. No. of Blows per foot for 18 in. drop of 300 lb. hammer 2 in. O.D. Sampler
Very Loose	0-3
Loose	3-8
Medium Compact	8-20
Compact	20-35
Very Compact	over 35

Consistency (Plastic Soils)	
Very Soft	0-2
Soft	2-6
Firm	6-12
Stiff	12-20
Hard	over 20

Amount of Component Material	Color
Primary Component Capitalized	
"and" 50% to 40% of secondary component	BR - Brown
"some" 40% to 10% " " "	Gr - Gray
"trace" 10% to less " " "	Bk - Black
	Rd - Red

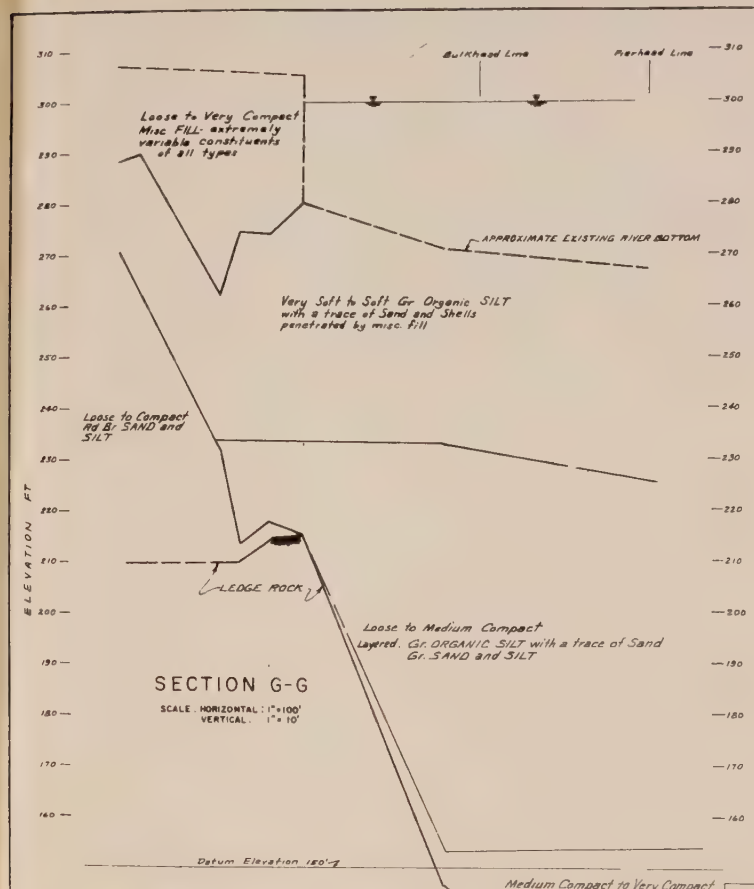
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET BOROUGH OF MANHATTAN
PIN 0024 (1)(1)

GENERAL SUBSURFACE SECTIONS
E-E AND F-F

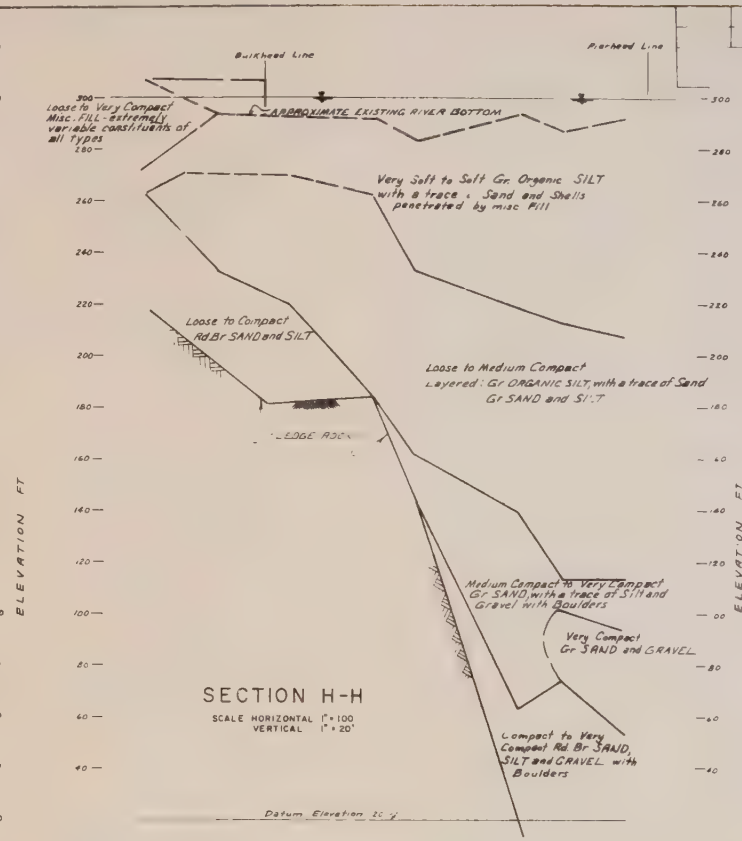
APPROVED Oct 1971
[signature]
DIRECTOR

REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM 1835 K



SECTION G-G

SCALE. HORIZONTAL: 1" = 100'
VERTICAL. 1" = 10'



SECTION H-H

SCALE HORIZONTAL 1" = 100
VERTICAL 1" = 20'

GENERAL NOTES

The subsurface conditions shown hereon were transcribed from the sources noted on Drawing No. 10 SM 1834

1) General Soil Strata descriptions and indicated boundaries are based on interpretation of all available subsurface information and may not necessarily show the actual variation in subsurface conditions between borings and samples.

2) The observed water levels and/or conditions indicated on the soil profiles are as recorded at the time of drilling. These water levels and/or conditions may vary considerably, with time, according to the prevailing climate, rainfall and other factors.

3) Sound engineering judgment was exercised in preparing the subsurface information presented hereon. This information was prepared and is intended for State design purposes only. Its presentation on the plans or elsewhere is for the purpose of providing others with access to the identical information available to the State. This information is presented in good faith but is not intended as a substitute for personal investigation, interpretations or judgment of the Contractor.

PREPARED BY Jean Simmons
DRAWN BY N. Pulen
CHECKED BY R.S. Cheney

LEGEND

The following tables summarize the descriptive information used on this profile.

Density (Non Plastic Soils)	Avg. No. of Blows per foot for 18 in. drop of 300 lb. hammer 2 in. O.D. Sampler
Very Loose	0-3
Loose	3-8
Medium Compact	8-20
Compact	20-35
Very Compact	over 35

Consistency (Plastic Soils)	
Very Soft	0-2
Soft	2-6
Firm	6-12
Stiff	12-20
Hard	over 20

Amount of Component Material		Color
Primary Component Capitalized		
"and"	50% to 40% of secondary component	Br - Brown
"some"	40% to 10% " " "	Gr - Gray
"trace"	10% to less " " "	Bk - Black
		Rd - Red

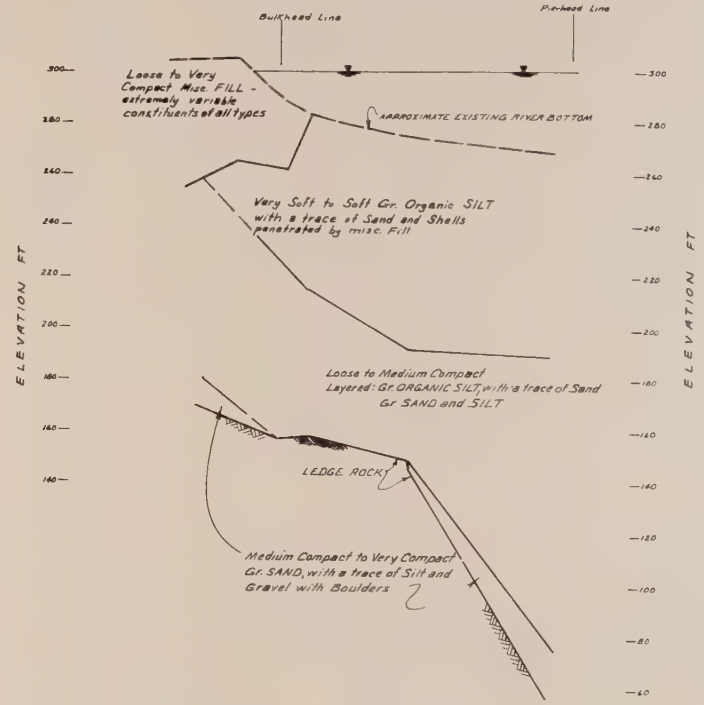
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024 11 111

GENERAL SUBSURFACE SECTIONS
G-G AND H-H

APPROVED Oct 11 1972
DIRECTOR

REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM 1828J



SECTION I-I

SCALE HORIZONTAL 1"=100'
VERT 1"=20'

See Drawing No. 10S 1A - for General Notes

GENERAL NOTES

The subsurface conditions shown hereon were transcribed from the sources noted on Drawing No. 10 SM 1834

1) General Soil Strata descriptions and indicated boundaries are based on interpretation of all available subsurface information and may not necessarily show the actual variation in subsurface conditions between borings and samples.

2) The observed water levels and/or conditions indicated on the soil profiles are as recorded at the time of drilling. These water levels and/or conditions may vary considerably, with time, according to the prevailing climate, rainfall and other factors.

3) Sound engineering judgment was exercised in preparing the subsurface information presented hereon. This information was prepared and is intended for State design purposes only. Its presentation on the plans or elsewhere is for the purpose of providing others with access to the identical information available to the State. This information is presented in good faith but is not intended as a substitute for personal investigation, interpretations or judgment of the Contractor.

PREPARED BY [illegible]
DRAWN BY M. Palermo
CHECKED BY R.S. Cheney

LEGEND

The following tables summarize the descriptive information used on this profile.

Density (Non Plastic Soils)	Avg. No. of Blows per foot for 18 in. drop of 300 lb. hammer 2 in. O.D. Sampler
Very Loose	0-3
Loose	3-8
Medium Compact	8-20
Compact	20-35
Very Compact	over 35

Consistency (Plastic Soils)	
Very Soft	0-2
Soft	2-6
Firm	6-12
Stiff	12 20
Hard	over 20

Amount of Component Material	Primary Component Capitalized
"and"	50% to <0% of secondary component
"some"	40% to 10% - " -
"trace"	10% to less " -

Color	
BR	Brown
Gy	Grey
Bk	Black
Rd	Red

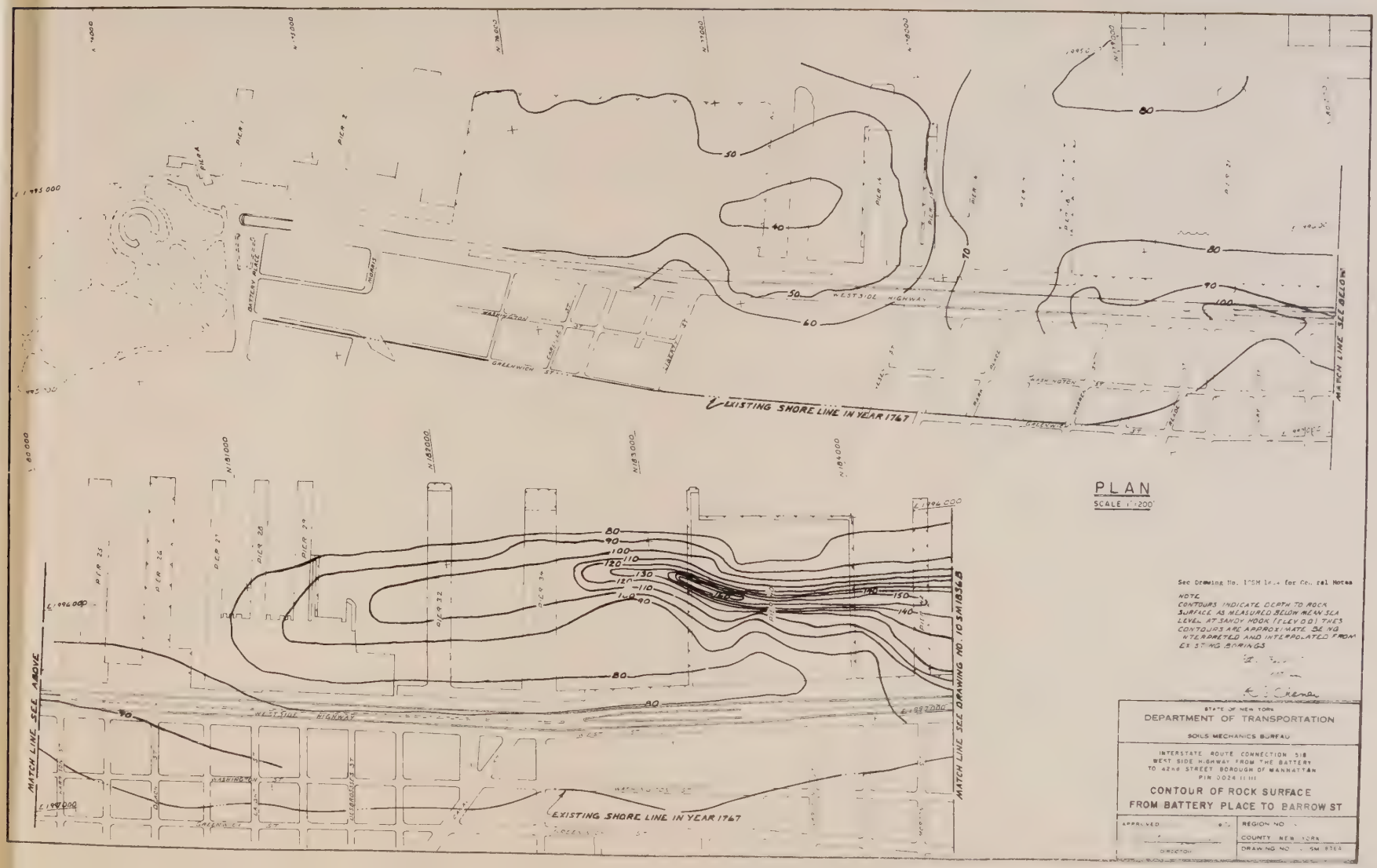
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024.11.111

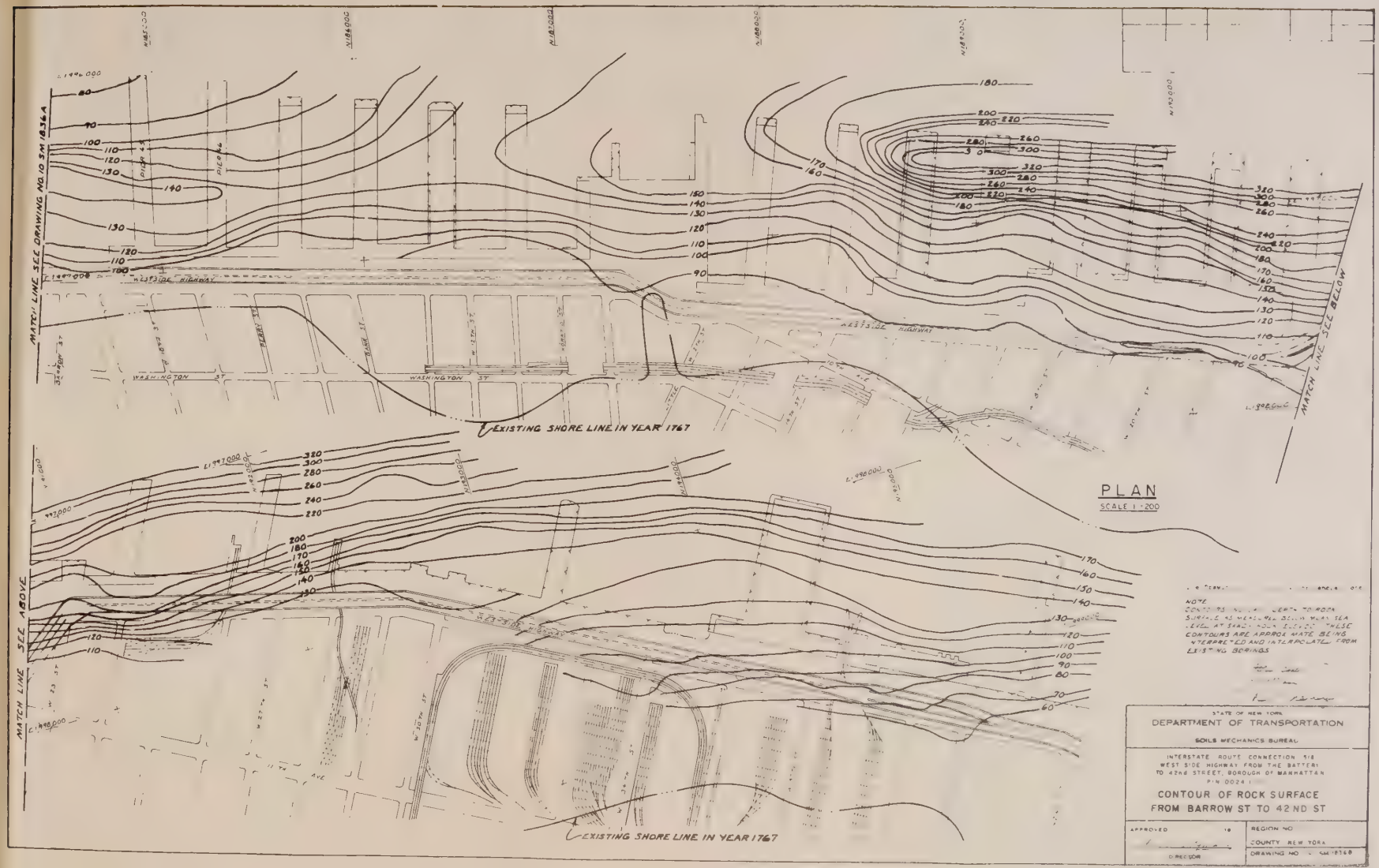
GENERAL SUBSURFACE SECTIONS
I-I

APPROVED Oct. 1972
DIRECTOR

REGION NO 2
COUNTY NEW YORK
DRAWING NO 10 SM 1835 L



PLAN
SCALE 1"=200'
EXISTING SHORE LINE IN YEAR 1767
MATCH LINE SEE BELOW
MATCH LINE SEE ABOVE
MATCH LINE SEE DRAWING NO. 10 SM 1836 B
WESTSIDE HIGHWAY
BATTERY PLACE
GREENWICH ST
WASHINGTON ST
PIER 1
PIER 2
PIER 25
PIER 26
PIER 27
PIER 28
PIER 29
PIER 32
PIER 34
N 181000
N 182000
N 183000
N 184000
E 1996000
E 1997000
80
90
100
110
120
130
140
150
60
70
40
50
Sec Drawing No. 10SM 1836 for General Notes
NOTE
CONTOURS INDICATE DEPTH TO ROCK SURFACE AS MEASURED BELOW MEAN SEA LEVEL AT SANDY HOOK (ELEV 0.0) THES CONTOURS ARE APPROXIMATE BEING INTERPRETED AND INTERPOLATED FROM EXISTING BORINGS
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU
INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET BOROUGH OF MANHATTAN
PIN 0024 11 111
CONTOUR OF ROCK SURFACE
FROM BATTERY PLACE TO BARROW ST
APPROVED
DIRECTOR
REGION NO
COUNTY NEW YORK
DRAWING NO


MATCH LINE SEE DRAWING NO. 10 SM 1836A
MATCH LINE SEE BELOW
MATCH LINE SEE ABOVE
WESTSIDE HIGHWAY
WASHINGTON ST
EXISTING SHORE LINE IN YEAR 1767
PLAN
SCALE 1:200
NOTE
CONTOURS ARE APPROXIMATE BEING INTERPRETED AND INTERPOLATED FROM EXISTING BORINGS
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU
INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024 1
CONTOUR OF ROCK SURFACE
FROM BARROW ST TO 42 ND ST
APPROVED
DIRECTOR
REGION NO
COUNTY NEW YORK
DRAWING NO

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO 10
COUNTY New York
S.S.M. PROJ NO.
PROJECT PIN 0024.11 Miller (W Side) Highway
QUAD. LOCATION
SOIL SERIES
DATE, START 5/3/72
DATE, FINISH
HOLE NO. P-21
LINE & STA N179548 E995626
OFFSET
SURF. ELEV. 30520
DEPTH TO WATER Variable (ALSO DESCRIBE UNDER "REMARKS")
CASING O.D. I.D. 4"
SAMPLER O.D. 2" I.D. 1½"
WEIGHT OF HAMMER 300
INSIDE LENGTH OF SAMPLER 18"
HAMMER FALL CASING 18 SAMPLER 18

DESCRIPTION OF SOIL AND ROCK	REMARKS
	27.5' from pier deck to top of mud water elev fluctuates with tide. Attempted undisturbed at 30-31.5 No recov. Weight of casing was sufficient to progress casing to 52' without having to use hammer.
Soft Organic Silt	J-1 30'-32' T-2 35'-36.5' J-3 40'-41.5' T-4 47'-48.5'
Organic Silt	
Organic Silt	J-5 52'-53.5
Organic Silt and Rock Frag.	
Organic Silt Some Rock Frag. and Sand	
Organic Silt	T-9 72'-73.5'
Top of Rock	
Summary of rock drilling NX-5' double tube BBL. Run #1 77'8"-82'8" 65% recov 27 pcs Soft surface Wedging and Whip in Rods Probably accounts for poor recovery Run #2 82'8"-87'8" 80% recov 7 pcs 1'3" quartz intrus 84'8"± to 86'±	Wood in wash at 77' J-6 77'-77.6' Soft rock in shoe of spoon Run #3 87'8"-92'8" 95% recov 178 pcs Run #4 92'8"-97'8" 3 pcs 100% recov 36" longest pc.

MANHATTAN SCHIST

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS TO IDENTICAL INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF THE BIDDER.

DRILL RIG OPERATOR [redacted] Kenipp
SOIL DESCRIPTIONS J. C. Griek
ROCK DESCRIPTIONS
DISTRICT SOILS ENGR. J. C. Griek
SHEET ___ OF ___. HOLE NO. P-21

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 10
COUNTY New York
[redacted] PROJ. NO.
PROJECT Miller (West Side) Highway PIN 0024.11
QUAD. LOCATION
SOIL SERIES
DATE, START 5/16/72
DATE, FINISH 5/18/72
HOLE NO. P-21A
LINE & STA N179548 E995626
OFFSET
SURF. ELEV. 305.20
DEPTH TO WATER (ALSO DESCRIBE UNDER "REMARKS")
CASING O.D. I.D. 4"
SAMPLER O.D. 3" Tube
WEIGHT OF HAMMER 300
INSIDE LENGTH OF SAMPLER
HAMMER FALL CASING 18 SAMPLER 18

DESCRIPTION OF SOIL AND ROCK	REMARKS
	This boring progressed in an attempt to obtain continuous tube samples in the top 20' of the river bottom.
Black Soft Silt	T-1 22'-23.5' partial recov. T-2 23.5'-25.0' T-3 25.0'-26.5' T-4 26.5'-28.0' T-5 28.0'-29.5' T-6 29.5'-31.0' T-7 31.0'-32.5' T-8 32.5'-34.0' T-9 34.0'-35.5' T-10 35.5'-37.0' J-11 37.2'-38.8'
Refusal on tube press at 37.2' J-11 wood & O.L.	Samples sent to S.M.B. via Cardinale on 5/19/72

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DRILL RIG OPERATOR DeKenipp
SOIL DESCRIPTIONS
ROCK DESCRIPTIONS
DISTRICT SOILS ENGR. J. C. Griek
SHEET ___ OF ___. HOLE NO. P-21A

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 10
COUNTY New York
S.S.M. PROJ NO.
PROJECT Miller (W. Side) Highway PIN 0024.11
QUAD. LOCATION
SOIL SERIES
DATE, START 7/6/72
DATE, FINISH
HOLE NO. P-40
LINE & STA N183684 E995275
OFFSET
SURF. ELEV. 303.63
DEPTH TO WATER (ALSO DESCRIBE UNDER "REMARKS")
CASING O.D. 4½" I.D. 4"
SAMPLER O.D. 2" I.D. 1½
WEIGHT OF HAMMER 300#
INSIDE LENGTH OF SAMPLER 18"
HAMMER FALL CASING 18 SAMPLER 18

DESCRIPTION OF SOIL AND ROCK	REMARKS
	Vane Shear Test on this Pier Coordinate location N 183750 E 1995200
Organic Silt, Trace of Sand, Trace of Shell	
Soft Gray Silt, Trace of Wood, Gravel at 55'	
Trace Rock Fragments	
Some Rock Fragments	

(CONTINUED)

DESCRIPTION OF SOIL AND ROCK	REMARKS
100'-113'± Coarse Sand, Trace of Silt and Gravel	Running Sand
113'-123'± Fine Sand, Some Silt, Trace Gravel	
123' Top of Rock, Casing Seated to 123' 9"	
Drilled with NX Diamond Bit [illegible] - 100% Recov. [illegible] - 131' [illegible] 70% Reco [illegible] - [illegible] 50% Recov.	

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DRILL RIG OPERATOR DeKenipp
SOIL DESCRIPTIONS J. C. Griek
ROCK DESCRIPTIONS
DISTRICT SOILS ENGR. J. C. Griek
SHEET ___ OF ___. HOLE NO. P-40

PREPARED BY
DRAWN BY
CHECKED BY

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024.11 III

SUBSURFACE EXPLORATION LOGS

REGION NO. 10
COUNTY NEW YORK
DRAWING NO. 0 1 84 3

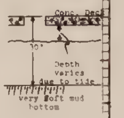
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 10
COUNTY Manhattan
B.S.M. PROJ. No. 0024.11

HOLE NO. P-76
LINE & STA. N194391 E997757
OFFSET

PROJECT Miller Expy (West Side Hwy) Pier 76
QUAD. LOCATION
SOIL SERIES
DATE, START
DATE, FINISH
SURF. ELEV. 105.78
DEPTH TO WATER (ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 4" I.D. 3½"
SAMPLER O.D. 3½" I.D. 3"
WEIGHT OF HAMMER 300 lbs.
INSIDE LENGTH OF SAMPLER 20"
HAMMER FALL CASING 18" SAMPLER 18"

DESCRIPTION OF SOIL AND ROCK	REMARKS
	 Conc. Deck; 30'; Depth varies due to tide; very soft mud bottom
30'-50' Black Soft Silt. (Asphalt odor)	No blows on casing from 30'-40'. Had to hold casing from sinking into silt.
Traces wood [redacted]	1-No sample @ [illegible] [illegible]. Too soft.
Mica	2- @45' only 5" recovery in shelby put into jar sample
	[illegible] press by hand
50'-60' Black Silt (Soft) (Asphalt odor)	T3 - 52'-53'8"
Trace Mica, Shells, Wood	J4 - 53'8"-55'4"
	T5 - 55'4"-57'
	T6 - 57'-58'8"
Layers of fine sand	T7 - 58'8"-60'4"
	T8 - [illegible]
	T9 - [illegible]-64'5"
	T10-64'4"-66'
	T11-66'-67'8"
60'-93'	T12-67'8"-69'4"
Gray Silt	T13-69'4"-71'
Mica	T14-71'-72'8"
Traces Fine Gray Sand. Trace Wood	J15-73'0"-74'8"
	T16-78'-79'8"
	J17-83'-84'6"
	T18-88'-89'8"
	J19-93'-94'6"
93'-100'	T20-98'-99'8"
Gray Silt	
Heavy Wood	*Hit very heavy wood fill @99'5" bent shelby
	Had to drill wood with Hawthorne Bit from 99'5"-105'

CONTINUED

DESCRIPTION OF SOIL AND ROCK	REMARKS
100'-120'	J21 - 105'-106'6"
	[redacted]
Gray Silt	T23 - 113'-114'8"
Layers of Gray Sand	J24 - 119'-1[illegible]'6"
Some wood	J25 - 124'-125'8"
Trace shell, Mica	T26 - 129'-130'8"
	J27 - 134'-135'6"
120'-140'	J28 - 139'-140'6"
	[illegible] - 144'-145'[illegible]
Gray Silt / Gray Fine Sand } Layers	J30 - 149'-150'6"
Trace [illegible]	[illegible]
14[illegible]'-1[illegible]'	
Gray Fine Mica Sand	
Trace + Silt	
150'-189'	J31 -154'-155'6"
	J32 -159'-160'6"
Gray Sand & Silt	J33 -165'-166'6"
	J34 -170'-171'6"
	[illegible] -175'-176'6"
	[illegible] -180'-181'[illegible]
	[illegible] -185'-186'6"
	[illegible] -190'-191'6"
189'-195'	J39 -195'-196'6"
Very Dense Gray Sand Silt & Gravel	
Some Broken Rock	*13' Runup on casing after missed sample
195'-19[illegible]'4"	
Gray Fine Sand	
Trace Silt	
Trace Gravel	
Top of Rock 197'4"	

CONTINUED

DESCRIPTION OF SOIL AND ROCK	REMARKS
Run No. 1 197'4"-202'3"	Took four runs into rock with
4'10" recovery 99% 9 pieces Manhattan Shist	NX double tube core barrel - diamond
Run No. 2 202'3"-204'4"	
2'1" recovery 100% 4 pieces Hard Quartz Rock	
Run No. [illegible] 204'[illegible]-2[illegible]' [illegible] recovery [illegible] [illegible] pieces [illegible] quartz [illegible]	
[illegible] recovery [illegible] 1[illegible] pieces [illegible] quartz rock	*Spring [illegible] collapsed [illegible] up into core barrel [illegible]
Bottom of Hole [illegible]14'	
Bottom [illegible]14'	

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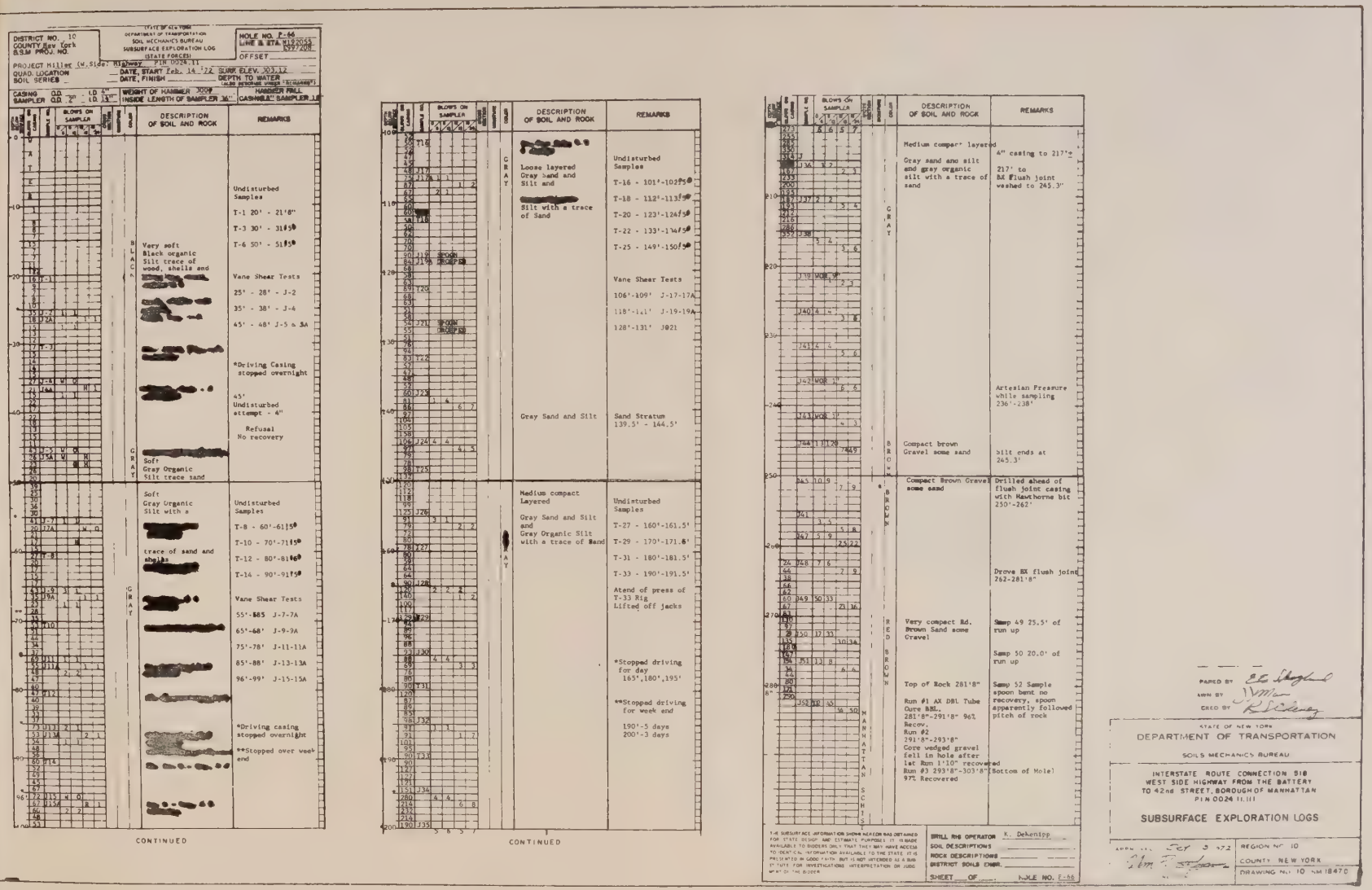
DRILL RIG OPERATOR Kipybida
SOIL DESCRIPTIONS Lakatos
ROCK DESCRIPTIONS
DISTRICT SOILS ENGR.
SHEET ___ OF ___ HOLE NO. P-76

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
P.I.N. 0024 11 111

SUBSURFACE EXPLORATION LOGS

PREPARED BY E.E. [illegible]
DRAWN BY J.J. [illegible]
CHECKED BY R.S. Cheney
APPROVED Oct 13 1972 Wm P Hofmann
REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 1847C



DISTRICT NO. 10
COUNTY New York
B.S.M PROJ. NO.

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

HOLE NO. P-66
LINE & STA. N192055
E997208
OFFSET

PROJECT Miller (W.Side) Highway PIN 0024.11
QUAD. LOCATION
SOIL SERIES
DATE, START Feb. 14 '72 SURF. ELEV. 303.12
DATE, FINISH
DEPTH TO WATER
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. I.D. 4"
SAMPLER O.D. 2" I.D. 1½"
WEIGHT OF HAMMER 300#
INSIDE LENGTH OF SAMPLER 36"
HAMMER FALL CASING 8" SAMPLER 18"

Depth	Blows on Sampler	Description of Soil and Rock	Remarks
0			
10		Very soft Black organic Silt trace of wood, shells and	Undisturbed Samples T-1 20' - 21'8" T-3 30' - 31'5" T-6 50' - 51'5"
20			Vane Shear Tests 25' - 28' - J-2 35' - 38' - J-4 45' - 48' J-5 & 5A
30			*Driving Casing stopped overnight
40			45' Undisturbed attempt - 4" Refusal No recovery
50		Soft Gray Organic Silt trace sand	
60		Soft Gray Organic Silt with a trace of sand and shells	Undisturbed Samples T-8 - 60'-61'5" T-10 - 70'-71'5" T-12 - 80'-81'6" T-14 - 90'-91'5"
70			Vane Shear Tests 55'-58' J-7-7A 65'-68' J-9-9A 75'-78' J-11-11A 85'-88' J-13-13A 96'-99' J-15-15A
80			*Driving casing stopped overnight **Stopped over week end
90			
96'			

CONTINUED

Depth	Blows on Sampler	Description of Soil and Rock	Remarks
100		Loose layered Gray Sand and Silt and Silt with a trace of Sand	Undisturbed Samples T-16 - 101'-102'5" T-18 - 112'-113'5" T-20 - 123'-124'5" T-22 - 133'-134'5" T-25 - 149'-150'5"
120			Vane Shear Tests 106'-109' J-17-17A 118'-121' J-19-19A 128'-131' J021
130		Gray Sand and Silt	Sand Stratum 139.5' - 144.5'
140			
150		Medium compact Layered Gray Sand and Silt and Gray Organic Silt with a trace of Sand	Undisturbed Samples T-27 - 160'-161.5' T-29 - 170'-171.5' T-31 - 180'-181.5' T-33 - 190'-191.5' Atend of press of T-33 Rig Lifted off jacks
160			*Stopped driving for day 165',180',195' **Stopped driving for week end 190'-5 days 200'-3 days
170			
180			
190			
200			

CONTINUED

Depth	Blows on Sampler	Description of Soil and Rock	Remarks
210		Medium compact layered Gray sand and silt and gray organic silt with a trace of sand	4" casing to 217'± 217' to BX flush joint washed to 245.3"
220			
230			
240			Artesian Pressure while sampling 236'-238'
250		Compact brown Gravel some sand	Silt ends at 245.3'
260		Compact Brown Gravel some sand	Drilled ahead of flush joint casing with Hawthorne bit 250'-262'
270		Very compact Rd. Brown Sand some Gravel	Samp 49 25.5' of run up Samp 50 20.0' of run up
280		Top of Rock 281'8"	Samp 52 Sample spoon bent no recovery, spoon apparently followed pitch of rock
290		Run #1 AX DBL Tube Core BBL. 281'8"-291'8" 96% Recov. Run #2 291'8"-293'8" Core wedged gravel fell in hole after 1st Run 1'10" recovered Run #3 293'8"-303'8" 97% Recovered	(Bottom of Hole)

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DRILL RIG OPERATOR K. Dekenipp
SOIL DESCRIPTIONS
ROCK DESCRIPTIONS
DISTRICT SOILS ENGR.
SHEET OF
HOLE NO. P-66

PAPED BY [signature]
AWN BY [signature]
CKED BY [signature]

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 510
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024 11.111

SUBSURFACE EXPLORATION LOGS

APPROVED Oct 3 1972
[signature]

REGION NO. 10
COUNTY NEW YORK
DRAWING NO. 10 SM 18470

SUMMARY OF LABORATORY TEST DATA

SAMPLE IDENTIFICATION: Sample No. / Elevation (Elevation Mtl.+300) / Visual Description	CLASSIFICATION PROPERTIES: Natural Water Content % / Average Wet Density PCF / Specific Gravity of Solids	PHYSICAL PROPERTIES — CONSOLIDATION: Liquid Limit / Plasticity Index / Organic Content / Type of Test / Overburden Pressure PSF / Preconsolidation Pressure PSF / Compression Index Cc	PHYSICAL PROPERTIES — STRENGTH: Axial Stress @ Failure for σ_3 PSF / Confining Stress, σ_3 PSF / Natural Water Content % / Water Content % at One Of Test / Overburden Pressure PSF / Estimated Preconsolidation Pressure PSF / Compression Index Cc
PIER 21			
J1 275.0 — Gn & Bn L, O-S w/mo PCS & Sh (M-W-LPL) 159			
T2 270.0 — Gn L, O & FS w/Sh (M-SF-LPL) 111.2	115.5 65.6 12.8 85.4 2.44	CU 270 230 288 114.2 101.5; CU 270 1060 2736 114.5 77.1; CU 270 2300 5040 115.9 61.0	107.4 270 390 1.00
J3 269.0 — Gn & Bn L, O-S w/mo PCS & Sh (M-W-LPL) 159			
T4 258.0 — Dk Bn & Gn O-S w/Sh (M-SF-LPL) 112.4	114.0 66.8 87.4 2.63	CU 100 310 438 116.0 104.2; CU 100 1060 2880 115.7 77.6; CU 100 1970 5328 116.8 65.0	113.6 420 480 1.08
J5 253.0 — Gn & Bn OL-S (M-LPL) 102			
J6 248 — Gn & Bn G, R to FS & LAG (M-W-NPL) 54			
J7 243 — Gn & Bn G, R to FS&LAG & Mica (M-W-NPL) 49			
J8 238 — Gn & Bn OL-S w/pocs Bn F to RS, L-O w/Sh (M-LPL) 62			
T9 233 — Dk Gn G, R to FS & L & Sh w/O & Mica (M-Loose-NPL) 58	117.5 63.6 92.3 2.60	CU 1220 320 720 80.7 83.5; CU 1220 850 1728 87.2 69.1; CU 1220 1260 5472 92.8 67.0	
J10 228 — Gn OL-S (M-LPL) 118; Gn Bn L, Mica NO-S (M-LPL) 186			
PIER 21A			
T1 283 — Gn OL 260			
T2 281.5 — Gn L, FS&O w/Sh O-L, occas (M-SF-NPL) 182.0	125.0 78.1 12.2 82.2 2.58	CU 50 110 72 154.1 122.4; CU 50 1300 2736 159.0 69.1; CU 50 2620 5328 159.1 59.7	206.6 50 - 2.11
T3 280 — Gn OL-S&Sh (M-SF-NPL) 185.1	114.1 68.9 12.7 82.0 2.54	CU 75 60 72 150.1 124.5; CU 75 950 2736 157.9 91.0; CU 75 680 5328 155.0 68.6	136.6 75 300 1.28
T4 278.5 — Gn OL-S&C w/mo pcs (M-SF-NPL) 138.2	32.1 12.2 14.1 82.8 2.52	CU 95 60 72 140.8 116.0; CU 95 1025 2736 142.2 66.8; CU 95 1620 5328 142.6 57.1	131.2 85 300 1.31
T5 277 — Gn OL-S (M-SF-NPL) 148.0	70.9 19.9 82.7 2.54	CU 115 360 288 131.0 84.0; CU 115 1260 2736 135.5 69.3; CU 115 2300 5328 135.4 57.2	149.5 115 375 1.21
T6 275.5 — Gn OL-S&Sh & C w/mo pcs (M-SF-LPL) 118.6	11.8 84.6 2.58	CU 145 75 72 119.0 107.9; CU 145 1000 2736 122.2 61.0; CU 145 2190 5328 123.2 55.9	116.1 145 330 1.27
T7 274.3 — Gn OL-S&C (M-SF-NPL) 125.3	14.3 85.0 2.52	CU 180 196 144 122.6 107.0; CU 180 1060 2880 124.8 67.2; CU 180 2240 5472 123.7 58.1	131.6 180 270 1.41
T8 272.5 — Gn OL-S&C&Sh (M-SF-NPL) 126.6	12.6 84.8 2.52	CU 220 75 144 122.4 109.7; CU 220 950 2880 123.6 67.6; CU 220 2050 5472 121.3 58.4	133.0 220 310 1.42
T9 271.0 — Gn OL-C&S, Sh&O (M-SF-NPL) 124.4	14.0 85.0 2.49	CU 250 110 144 122.5 110.8; CU 250 1060 2880 123.6 69.9; CU 250 2200 5472 122.7 59.2	129.2 250 320 1.34
T10 269.5 — Gn OL-S&C&Sh (M-SF-NPL) 114.4	66.3 25.1 10.1 86.6 2.49	UU * 275 132.2 2500 113.4	115.4 278 310 1.18
J11 268.0 — Gn & Bn OL w/mo pcs (M-W-NPL) 145			

SUMMARY OF LABORATORY TEST DATA

SAMPLE IDENTIFICATION: Sample No. / Elevation (Elevation Mtl.+300) / Visual Description	CLASSIFICATION PROPERTIES: Natural Water Content % / Average Wet Density PCF / Specific Gravity of Solids	PHYSICAL PROPERTIES — CONSOLIDATION: Liquid Limit / Plasticity Index / Organic Content / Type of Test / Overburden Pressure PSF / Preconsolidation Pressure PSF / Compression Index Cc	PHYSICAL PROPERTIES — STRENGTH: Axial Stress @ Failure for σ_3 PSF / Confining Stress, σ_3 PSF / Natural Water Content % / Water Content % at One Of Test / Overburden Pressure PSF / Estimated Preconsolidation Pressure PSF / Compression Index Cc
PIER 40			
T1 279 — Dk Gn OL			
T2 273 — Dk Gn OL-G			
T3 276 — Dk Gn OL-G			
T4 274 — Dk Gn OL-G (N-SF-NPL) 243			
J5 273 — Poss. Fill Material Bn & Gn OL-S&G w/pcs concrete (N-NPL) 185			
J6 270 — Gn-G to FS&LAG w/mo pcs. (M-NPL)			
T7 265 — Poss. Fill Material Bn&L G w/mo pcs. (M-SF-NPL)			
T8 263 — Poss. Fill Material Bn&L G w/mo pcs. (M-SF-NPL) 65			
T9 261 — Bn&L-G w/wo pcs. (M-SF-NPL) 115			
T10 260 — Bn&L-G w/mo pcs. (N-SF-NPL)			
J11 259 — Bn&L GAR to RS (M-NPL) 97			
J12 255 — Poss. Fill Material Gn&Bk Sh&St., LAF to RS&G-G (M-NPL) 75			
J13 251 — Gn&Bk OL-S&G (M-NPL) 70			
T14 246 — Gn & Bk OL-C&S & Sh (M-SF-FM-LPL) 63.2	57.6 30.4 3.90 102.1 2.66	CU 570 570 570 570 1100 2120 576 3024 5328 61.3 62.6 62.8 57.1 66.6 43.9	64.5 570 1150 .580
J15 240 — Gn & Bn OL-S (M-LPL) 60			
T16 235 — Gn OL, FS-G (M-VSF-NPL) 58.2	3.52 104.7 2.72	CU 850 850 850 680 1970 2120 720 3168 5472 53.0 63.8 66.5 47.7 61.4 39.4	55.7 830 940 .35
J17 230 — Gn & Bn CL-S & C & Sh (M-LPL) 59			
J18 225 — Gn & Bn OL-S & & Sh (M-W-NPL) 60			
J19 219 — Rd & Bn R to FS, S, L-G (M-W-NPL)			
J20 213 — Rd & Bn R to FS-L&G (M-NPL)			
J21 207 — Rd & Bn F to RS-L (M-NPL)			
J22 201 — Rd & Bn R to FS-L&G (M-NPL)			
J23 296 — Bn F to RS,L (M-NPL)			
J24 190 — Bn F to RS, L-G (M-NPL)			
J25 185 — Bn F to RS, L-G (M-NPL)			

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION '518'
WEST SIDE HIGHWAY FROM THE BATTERY
TO 48th STREET, BOROUGH OF MANHATTAN
PIN 0024.11.111

SUMMARY OF LABORATORY TEST DATA
BORING NO. P-21, P-21A AND P-40

PREPARED BY P.A. Weller
DRAWN BY J.J. Moni
CHECKED BY Joel F. Sanglini

APPROVED Oct. 13 1972
DIRECTOR
ALBANY, NEW YORK

SHEET NO. 10
DRAWING NO. 10

SUMMARY OF LABORATORY TEST DATA

SAMPLE IDENTIFICATION			CLASSIFICATION PROPERTIES						PHYSICAL PROPERTIES: STRENGTH						PHYSICAL PROPERTIES: CONSOLIDATION			
SAMPLE NUMBER	ELEVATION (DATUM MHL+300)	VISUAL DESCRIPTION	NATURAL WATER CONTENT % AVERAGE OF ENTIRE SAMPLE	LIQUID LIMIT	PLASTICITY INDEX	ORGANIC CONTENT	AVERAGE WET DENSITY PCF	SPECIFIC GRAVITY OF SOLIDS	TYPE OF TEST	OVERBURDEN PRESSURE PSF	SHEAR STRESS @ FAILURE FOR 5% PSF	CONFINING STRESS PSF	NATURAL WATER CONTENT %	WATER CONTENT @ END OF TEST %	NATURAL WATER CONTENT %	OVERBURDEN PRESSURE PSF	ESTIMATED PROBABLE PRECONSOLIDATION STRESS PSF	COMPRESSION INDEX Cc
		PIER 66																
T-1	280	Bk L, O-Wo & SH & G/Bk L, O-S(M-VSF-NPL)	102	94.2	55.7	8.18	87.2	2.58	UU•	0	140	360	89.7		97	0	640	1.00
J2 J2A	275	Dk Gr L&O-S&G (M-LPL)	100/87															
T-3	270	Gr & Bk L, O-S & SH (M-SF-LPL)	90.3	95.5	55.9		100.2	2.64	CU	525	380 580 770	504 1008 1584	86.7 86.8 87.0	78.8 74.8 70.4	94.0	525	700	1.06
J4 J4A	265	Dk Gr L&O-S w/SH (M-NPL)	87/83															
J5 J5A	255	Gr L, O-S w/SH (M-LPL)	60/56															
T5	250	Gr. O L Gr FS&L w/SH (M-FM-LPL)	48.0	42.7	18.2	3.35	109.9	2.66	UU CU CU	1150 1150 1150	455 1310 2070	3460 1120 2390	45.9 45.0	41.2 36.8	56.8	1150	1150	.497
J7 J7A	244	Gr L, O-S w/SL (M-NPL)	59/57															
T8	240	Gr L, O-S w/SL (M-NPL)																
J9 J9A	235	Gr L, O-S w/SL (M-NPL)	58/62															
T10	230	Dk Gr O L Gr FS&L (M-FM-LPL)	52.0	59.2	29.0	[illegible]	105.8	2.70	CU CU CU	1900 1900 1900	1280 2270 3000	1872 3744 5472	51.3 53.1 52.3	42.9 38.1 35.9	51.7	1900		.390
J11 J11A	225	Dk Gr OL-S (M-SF-LPL)	59/51															
T12	220	Dk Gr OL w/pocs, Gr FS (M-SF-FM-LPL)	57.2	56.0	28.0	3.74	104.0	2.70	UU•• UU• UU	2400 2400 2400	221 374 726.5	6500 6500 6500	55.5 55.5 55.5		58.5	2400	1950	.601
									CU CU	2400 2400	1313 2980	2304 6480	55.9 56.1	50.1 41.4				
J13 J13A	215	Dk Gr OL-S (M-SF-FM-LPL)	60/54															
T14	210	Dk Gr OL-S (M-SF-FM-LPL)	57.8	57.6	28.5	4.34	103.2	2.69	CU CU CU	2800 2800 2800	1300 2750 4300	2592 5040 7488	55.2 55.6 54.6	45.3 41.5 38.5	60.5	2800	2250	.690
J15 J15A	204	Gr OL-S w/SH (M-SF-FM-LPL)	62/52															
T16	199	Gr OL-S w/SH (M-SF-FM-LPL)	44.9	48.0	23.2	3.56	110.1	2.72	UU• UU••	3200 3200	837.5 258.7	8500 9500	46.0 46.5		43.9	3150	3000	.429
									CU CU CU	3200 3200 3200	1320 2380 3450	3024 5760 8496	44.0 44.4 43.8	36.8 34.4 32.0				
J17 J17A	194	Gr OL-S w/thin layers Gr FS w/SH(M-FM-LPL)	40/40															
T18	188	Layered Gr. OL-S/Gr FS-L (M-FM-LPL)	38.2	29.5	6.3	2.91	114.2	2.72	UU CU CU	3700 3700 3700	567 1990 5090	9800 3600 9792	37.2 38.4 40.0	31.0 29.6	38.2	3700	4250	.294
J19 J19A	182	Gr L, FS, Gr OL (M-FM-LPL)	44/38															
T20	177	Gr L, FS, Gr OL (M-FM-LPL)	34.8				114.6	2.72		4200					34.8	4200	4200	.242
J21	172	Gr L, FS-O (M-FM-NPL)	38															
T22	167	Gr L, FS-O (M-FM-NPL)	33.9				115.2	2.70							33.9	4800	5100	.211
J23	162	Gr. L, FS&O (M-FM-NPL)	40															
J24	156	Gr L, FS&O (M-FM-NPL)	47															
T25	151	Gr OL-S (M-SF-LPL)	48.5	54.6	32.0	2.50	109.3	2.73	UU• CU CU	5600 5600 5600	429.5 2500 5000	13500 5328 14112	35.8 54.7 54.3	47.7 35.6	55.1	5600	4400	.800

SUMMARY OF LABORATORY TEST DATA

SAMPLE IDENTIFICATION			CLASSIFICATION PROPERTIES						PHYSICAL PROPERTIES: STRENGTH						PHYSICAL PROPERTIES: CONSOLIDATION			
SAMPLE NUMBER	ELEVATION (DATUM MHL+300)	VISUAL DESCRIPTION	NATURAL WATER CONTENT % AVERAGE OF ENTIRE SAMPLE	LIQUID LIMIT	PLASTICITY INDEX	ORGANIC CONTENT	AVERAGE WET DENSITY PCF	SPECIFIC GRAVITY OF SOLIDS	TYPE OF TEST	OVERBURDEN PRESSURE PSF	SHEAR STRESS @ FAILURE FOR 5% PSF	CONFINING STRESS PSF	NATURAL WATER CONTENT %	WATER CONTENT @ END OF TEST %	NATURAL WATER CONTENT %	OVERBURDEN PRESSURE PSF	ESTIMATED PROBABLE PRECONSOLIDATION STRESS PSF	COMPRESSION INDEX Cc
		PIER 66 (CONTINUED)																
J26	145	Gr. L, O-S w/thin layers Gr FS w/SH (M-LPL)	53															
T27	140	Gr L-O Gr FS-L (M-SF-LPL)	50.0	49.4	26.5		108.0	2.74	CU CU CU	6100 6100 6100	1375 4750 5375	5760 13512 14400	45.3 [illegible] 46.3	39.1 [illegible] 33.4	34.7	6100	7000	.759
J28	135	Gr L-O Gr FS-L (M-SF-LPL)	48															
T29	130	Gr L-O Gr FS-L (M-SF-LPL)	42.8	34.7	14.0		110.4	[illegible]	CU CU	6600 6600	3500 7600	6336 14400	38.1 39.5	33.9 29.0	[illegible]	6600	7000	[illegible]
J30	125	Gr L-O Gr FS-L (M-SF-LPL)	42															
T31	120	Gr L-O Gr FS-L (M-SF-LPL)	39.8	39.3	18.1		112.0	2.72	CU CU	7000 7000	4300 7500	6768 12096	41.0 40.0	35.8 29.8	38.8	7000	6600	.351
J32	115	Gr L-O w/thin layers Gr FS-L (M-SF-LPL)	40															
T33	110	Gr L, O-S & Mica/Gr FS, L-Mica (D-M-FM-NPL)	43.9				111.0	2.70	UU•	7500	142.7	12950	43.9					
J34	105	Gr L-S&O (M-NPL)	40															
J35	100	Gr L-S&O (M-NPL)	40															
J36	95	Gr L, FS-C&O & Mica (M-LPL)	41															
J37	90	Gr L, FS-C&O & Mica (M-LPL)	43															
J38	85	Gr L, FS-C&O & Mica (M-NPL)																
J39	79	Gr. L, FS-C&O & Mica (M-LPL)	49															
J40	74	Gr L, FS-O& Mica (M-NPL)																
J41	69	Gr L, FS-O & Mica (M-NPL)																
J42	64	Gr L, FS-O& Mica (M-NPL)																
J43	59	L, FS-O& Mica (M-NPL)	52															
J44	55	Dk Gr L, R to FS & G-O (M-NPL)																
J45	50	Br G, F to RS-L (M-NPL)																
J46	44	Br G-S (M-NPL)																
J47	42	Br G-S (M-NPL)																
J48	38	Br F to RS-G&L (M-NPL)																
J49	33	Br F to RS-G&L (M-NPL)																
J50	28	Br F to RS-G&L (M-NPL)																
J51	23	Br F to RS, G-L (M-NPL)																

[illegible] NO. [illegible] .8408 FOR NOTES

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 5:8
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024.11.111

SUMMARY OF LABORATORY TEST DATA
BORING NO. 66

PREPARED BY P.A. Walton
DRAWN BY R.G. Mm
CHECKED BY [illegible]

APPROVED Oct. 19 1972
[signature]
DIRECTOR

REGION NO. 0
COUNTY NEW YORK
DRAWING NO. 10 SM .8408

SUMMARY OF LABORATORY TEST DATA

SAMPLE NUMBER	ELEVATION (BATTERY DATUM MSL+100)	VISUAL DESCRIPTION	NATURAL WATER CONTENT % AVERAGE OF ENTIRE SAMPLE	LIQUID LIMIT	PLASTICITY INDEX	ORGANIC CONTENT	AVERAGE WET DENSITY PCF	SPECIFIC GRAVITY OF SOLIDS	TYPE OF TEST	OVERBURDEN PRESSURE PSF	SHEAR STRESS @ FAILURE FOR $\frac{1}{2}$" PSF	COMPUTED STRESS @ FAILURE PSF	NATURAL WATER CONTENT %	WATER CONTENT @ END OF TEST %	NATURAL WATER CONTENT %	OVERBURDEN PRESSURE PSF	ESTIMATED PREVIOUS PRECONSOLIDATION STRESS PSF	COMPRESSION INDEX C_c
		PIER 76																
J1	260	Gr & Br L, O & FS (M-M-NPL)	119															
J2	255	Br & Br L, O & FS (M-NPL)	62															
J3	249	Dk Br L, FS & SH & O w/OIL ODOR (M-SF-LPL)	40															
J4	247	Br & Br L, O & SH-S w/OIL ODOR (M-NPL)	55															
J5	245	Dk Gr L, FS & SH & O (M-LOOSE-LPL)	59															
J6	243	Dk Gr L-O w/SH AND OIL ODOR (M-SF-L*L*)	67															
J7	241	Dk Gr OL-S w/SH (M-SF-LPL)	71				33.3											
J8	240	Dk Gr OL w/SH (M-SF-LPL)	74				90.9											
J9	238	Dk Gr OL w/SH (M-SF-LPL)	67				95.											
J10	236	Dk Gr OL (M-SF-LPL)	72				96.3											
J11	235	Dk Gr OL (M-SF-LPL)	72				94.5											
J12	233	Dk Gr OL w/PCBS. Gr FS-L (M-SF-LPL)	62				99.4											
J13	231	Dk Gr & Br OL w/THIN LAYERS Gr FS-L (M-SF-SM-LPL)	66				96.9											
J14	230	Dk Gr L, FSM (M-SF-FM-LPL)	56				99.6											
J15	228	Dk Gr & Br L, O-S w/SH (M-NPL)	53															
T16	223	Gr OL-S (M-SF-FM-LPL)	62.9	61.2	31.5	3.95	97.8	2.66	CU CU	1700 1700	700 850	1152 2592	61.5 66.7	50.5 47.0	68.9	1700	1030	.510
									CU	1700	1780	3456	60.2	43.3				
J17	219	Gr. OL-S (M-LPL)	66															
T18	213	Gr. OL-S (M-SF-NPL)	58.8	60.0	28.1	3.70	100.4	2.66	CU CU	2000 2000	950 1520	1140 3024	59.3 68.1	48.6 42.3				
									CU	2000	2050	4104	57.8	39.4	57.9	2000		.413
J19	208	Gr. & Br. OL-S w/LARGE WOOD PCS. (M-LPL)	56															
T20	203	Dk Gr OL-S (M-SF-FM-NPL)	50.5	57.5	27.2	4.05	105.2	2.66	CU CU	2500 2500	1380 2040	1872 4248	46.7 56.4	41.4 45.2	54.8	2500	1880	.439
									CU	2500	2900	5472	49.8	39.8				
J21	195	Gr OL-CAS (M-LPL)	52															
J22	192	Gr OL-CAS w/WOOD PCS. (M-LPL)	65															
T23	187	Gr OL-S w/SH (M-FM-LPL	53.2	54.6	29.0	4.18	106.4	2.69	CU CU	3200 3200	1120 2220	2880 5472	45.9 49.5	43.8 41.5				
									CU	3200	3180	8064	54.2	38.4	55.1	3200	2450	.513
J24	182	Gr OL, FS-C w/WOOD PCS. (M-LPL)	41															
J25	176	Gr FS, L&O-C w/SH (M-NPL)	36															
T26	172	Gr Br FS-L Gr OL-S (M-SF-FM-NPL)	37	34.2	4.9	1.33	115.6	2.70	CU CU	4000 4000	2000 3800	3312 9504	38.8 50.5	34.5 28.9	36.2	4000		.189
J27	167	Gr Br FS-L Gr OL-S (M-SF-FM-NPL)	33															

SUMMARY OF LABORATORY TEST DATA

SAMPLE NUMBER	ELEVATION (BATTERY DATUM MSL+100)	VISUAL DESCRIPTION	NATURAL WATER CONTENT % AVERAGE OF ENTIRE SAMPLE	LIQUID LIMIT	PLASTICITY INDEX	ORGANIC CONTENT	AVERAGE WET DENSITY PCF	SPECIFIC GRAVITY OF SOLIDS	TYPE OF TEST	OVERBURDEN PRESSURE PSF	SHEAR STRESS @ FAILURE FOR $\frac{1}{2}$" PSF	COMPUTED STRESS @ FAILURE PSF	NATURAL WATER CONTENT %	WATER CONTENT @ END OF TEST %	NATURAL WATER CONTENT %	OVERBURDEN PRESSURE PSF	ESTIMATED PREVIOUS PRECONSOLIDATION STRESS PSF	COMPRESSION INDEX C_c
		PIER 76 (CONTINUED)																
J28	161	Gr FS-L&O (M-NPL)	31															
J29	156	Gr FS-L&O (M-NPL)	27															
J30	151	Gr OL, FS (M-NPL)	38															
J31	146	Gr OL, FS (M-NPL)	31															
J32	141	Layered Gr. O,-C Gr FS-L&O (M-NPL)	44															
J33	135	Gr Br FS, L&O (M-NPL)	41															
J34	130	Gr OL & Gr FS, L-C (M-NPL)	44															
J35	125	Layered Gr Br OL& Gr FS,L-O (M-NPL)	47															
J36	120	Br L,O-S/Gr OL/Br FS-L (M-NPL)	42															
J37	115	Gr & Br L, C-O (M-NPL)	55															
J38	110	Gr & Br L,C-O Br FS, G-C (M-NPL)	44															
J39	105	Gr Br F to RS, GrL (M-NPL)																

NOTES

1. Visual Description of Soil Samples

Sample Color	Bk	Black
	Gr	Grey
	Br	Brown
	Rd	Red
Visual Description - Constituent	L	Silt
	S	Sand
	C	Clay
	O	Organic
	G	Gravel
	Wd	Wood
	Sh	Shells
Relative Percentage of Soil Constituent	&	40% - 50%
	,	10% - 40%
	-	5% - 10%
Consistency	M	moist
	W	wet
	Sf	soft
	Fm	firm
	NPL	non-plastic
	LPL	low-plastic
	MPL	medium-plastic
Miscellaneous	w/	with
	pocs	pockets
	pcs	pieces
	poss	possible
	F	fine
	R	coarse

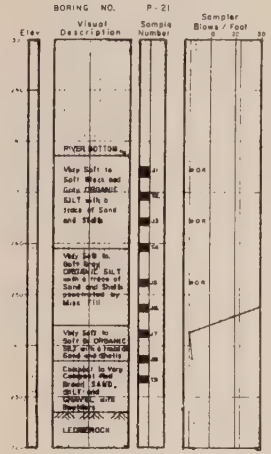
2. Sample numbers prefixed by J indicate jar samples taken from a split spoon sampler. Numbers prefixed by T indicate undisturbed tube samples.
3. The elevations listed are referenced to the top of the recovered samples.
4. The triaxial strength tests were of the following types:
   CU - Consolidated Undrained test
   UU - Unconsolidated Undrained test
5. Shear strength tests on undisturbed materials were performed on samples 2.8" high and 1.4" in diameter. The unconsolidated undrained tests [illegible] with an asterisk (U*) were samples 3.0" high and 1.375" [illegible]
6. Triaxial strength tests superscribed with a double asterisk (**) indicate a remolded sample 7.0" high and 3.375" in diameter
   Compression Index (C_c) Straight line portion of the virgin compression curve of a consolidation test e = e_0 - C_c log P
8. Load increments for consolidation tests were applied a maximum of three times per day with a minimum time interval between load applications of three hours. Longer durations were specified, as [illegible] sampling with slower drainage rates.
9. The most probable preconsolidation stress (psf) was found by the standard Casagrande construction

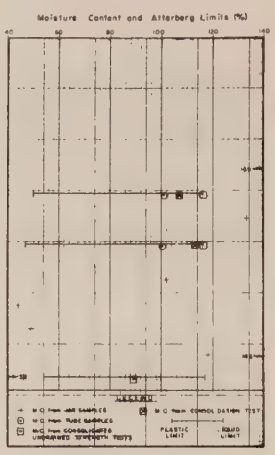
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

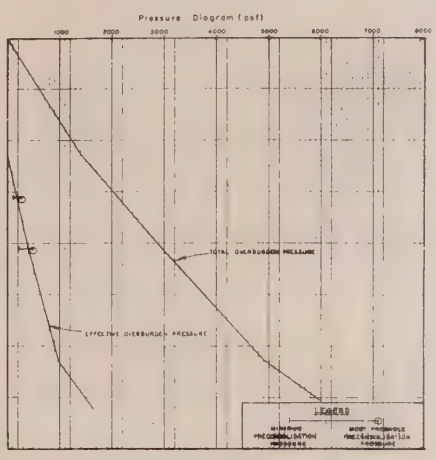
INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024.11.111

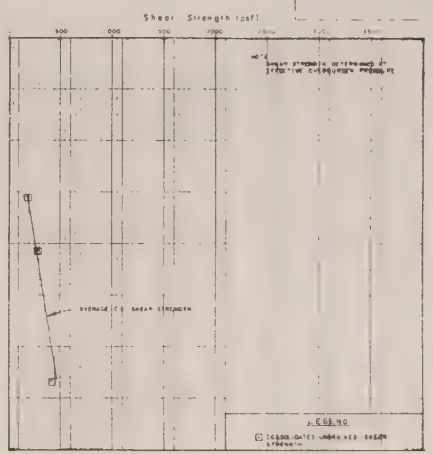
SUMMARY OF LABORATORY TEST DATA
BORING NO 76

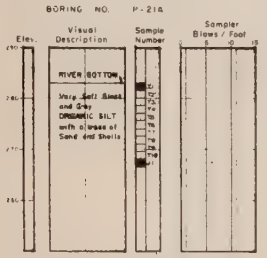
PREPARED BY	P. A. Walton	APPROVED	Oct 13 '72
DRAWN BY	J. Man	DIRECTOR	
CHECKED BY	[illegible]	REGION NO	0
		COUNTY	NEW YORK
		DRAWING NO	10 SM 1840C



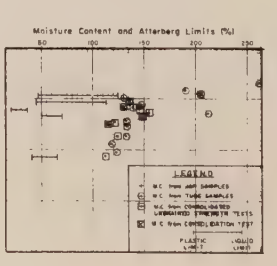


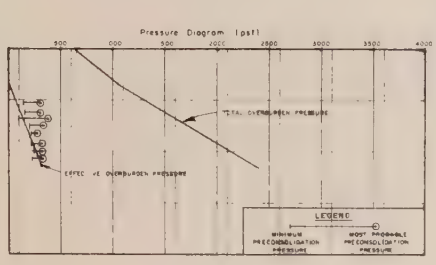


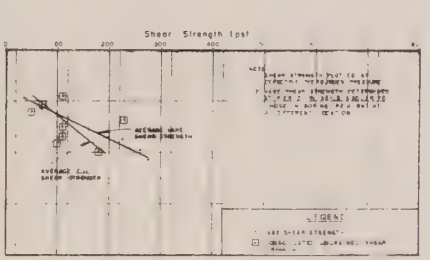




NOTE BORING P-21A WAS PROGRESSED ADJACENT TO BORING P-2 TO OBTAIN CONTINUOUS UNDISTURBED SAMPLES OF THE TOP 20 FT OF SOIL







NOTE
THE BASIC DATA FOR ALL STRENGTH TESTS ARE SHOWN ON DRAWING NO 10 SM 1840 A

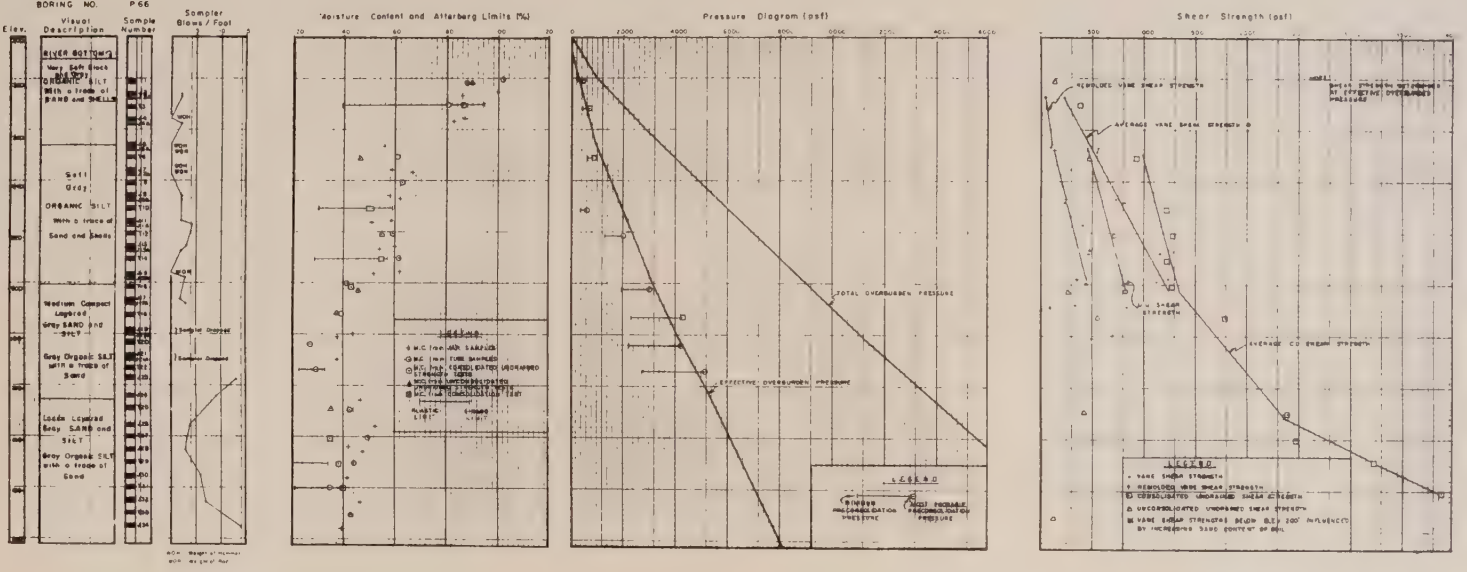
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY TO 42nd STREET BOROUGH OF MANHATTAN
P.I.N. 0024.11.11

SOIL PROPERTIES PROFILE
BORING NOS P-21 & P-21A

PREPARED BY
DRAWN BY
CHECKED BY

REGION 10
COUNTY NEW YORK



NOTE
THE BASIC DATA FOR ALL STRENGTH TESTS ARE SHOWN ON DRAWING NO 10 SM 1840 B

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY TO 42nd STREET, BOROUGH OF MANHATTAN
P.N. 0024.11.111

SOIL PROPERTIES PROFILE
BORING NO P-66

PREPARED BY
DRAWN BY
CHECKED BY

REGION NO
COUNTY NEW YORK
DRAWING NO 10 SM 1846 B

SM 292 (11/67)

10 SM 1842 A

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

CONSOLIDATION TEST

PROJECT INTERSTATE ROUTE CONNECTION 51B
P.I.N. 0024.11.111

HOLE NUMBER P 21A DEPTH _____

STATION _____ OFFSET _____

LABORATORY NUMBER _____

DATA CODE ____ MACHINE NUMBER ____

VISUAL DESCRIPTION _____

VERY SOFT GRAY ORGANIC SILT, WITH A TRACE OF SAND AND SHELLS

SAMPLE PROFILE

TEST SET UP BY _____ DATE ____

RANGE OF CLASSIFICATION TESTS

MOISTURE CONTENT	206.6	%
WET DENSITY	79.3	PCF
SPECIFIC GRAVITY	2.50	
LIQUID LIMIT		
PLASTIC LIMIT		
PLASTIC INDEX		
ORGANIC CONTENT		%

PERCENT FINER THAN
.074MM ____ .020MM ____ .002MM ____

PRECONSOLIDATION PRESSURE
MINIMUM _____ MAXIMUM _____

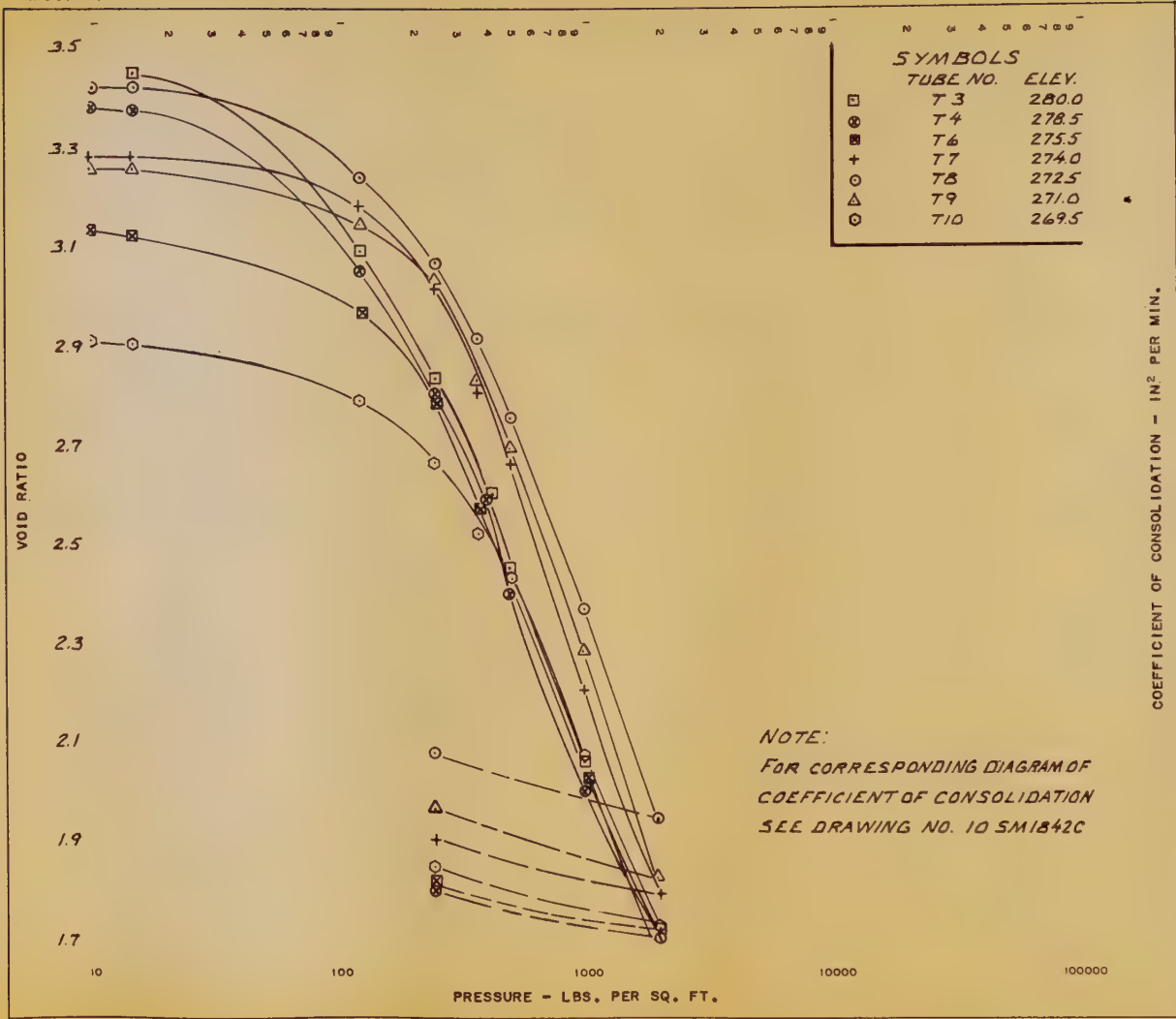
COMPRESSION INDEX _____

REMARKS: FOR DETAILED SUMMARY OF CLASSIFICATION TEST DATA SEE DRAWING NO. 10 SM 1840

DRAWN BY J.M. DATE 10/13/72
CHECKED BY R.S. Cheney DATE 10/13/72

SM 292 (11/67)

10 SM 1842 B



STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

CONSOLIDATION TEST

PROJECT INTERSTATE ROUTE CONNECTION 518
P.I.N. 0024.11.111

HOLE NUMBER P 211A DEPTH

STATION OFFSET

LABORATORY NUMBER

DATA CODE MACHINE NUMBER

VISUAL DESCRIPTION
VERY SOFT GRAY ORGANIC SILT, WITH A TRACE OF SAND AND SHELLS

SAMPLE PROFILE

TEST SET UP BY DATE

RANGE OF CLASSIFICATION TESTS

MOISTURE CONTENT	129.2 TO 136.6	%
WET DENSITY	81.6 TO 84.3	PCF
SPECIFIC GRAVITY	2.47 TO 2.52	
LIQUID LIMIT	95.5 TO 114.1	
PLASTIC LIMIT	39.6 TO 45.2	
PLASTIC INDEX	55.9 TO 68.9	
ORGANIC CONTENT		%

PERCENT FINER THAN
.074MM .020MM .002MM

PRECONSOLIDATION PRESSURE
MINIMUM MAXIMUM

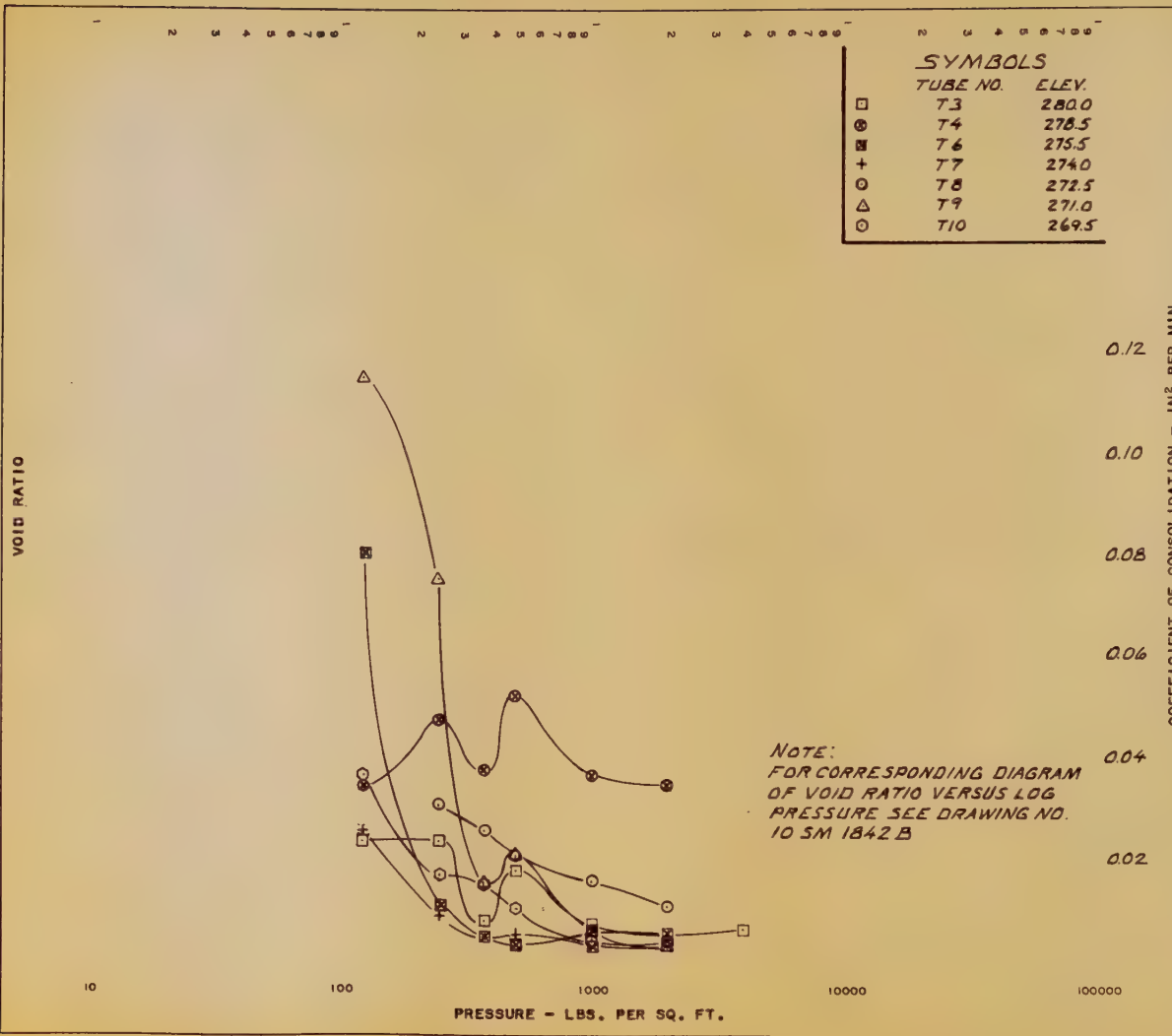
COMPRESSION INDEX

REMARKS: FOR DETAILED SUMMARY OF CLASSIFICATION TEST DATA SEE DRAWING NO. 10 SM 1840

DRAWN BY J. M. [illegible] DATE 10/13/72
CHECKED BY R.S. Cheney DATE 10/13/72

SM 292 (11/67)

10 SM 1842C



STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

CONSOLIDATION TEST

PROJECT INTERSTATE ROUTE CONNECTION 518
PIN. 0024.11.111

HOLE NUMBER P 21A DEPTH

STATION OFFSET

LABORATORY NUMBER

DATA CODE MACHINE NUMBER

VISUAL DESCRIPTION
VERY SOFT GRAY ORGANIC SILT, WITH A TRACE OF SAND AND SHELLS

SAMPLE PROFILE

TEST SET UP BY DATE

RANGE OF CLASSIFICATION TESTS

MOISTURE CONTENT	129.2 TO 136.6	%
WET DENSITY	81.6 TO 84.3	PCF
SPECIFIC GRAVITY	2.47 TO 2.52	
LIQUID LIMIT	95.5 TO 114.1	
PLASTIC LIMIT	39.6 TO 45.2	
PLASTIC INDEX	55.9 TO 68.9	
ORGANIC CONTENT		%

PERCENT FINER THAN
.074MM .020MM .002MM

PRECONSOLIDATION PRESSURE
MINIMUM MAXIMUM

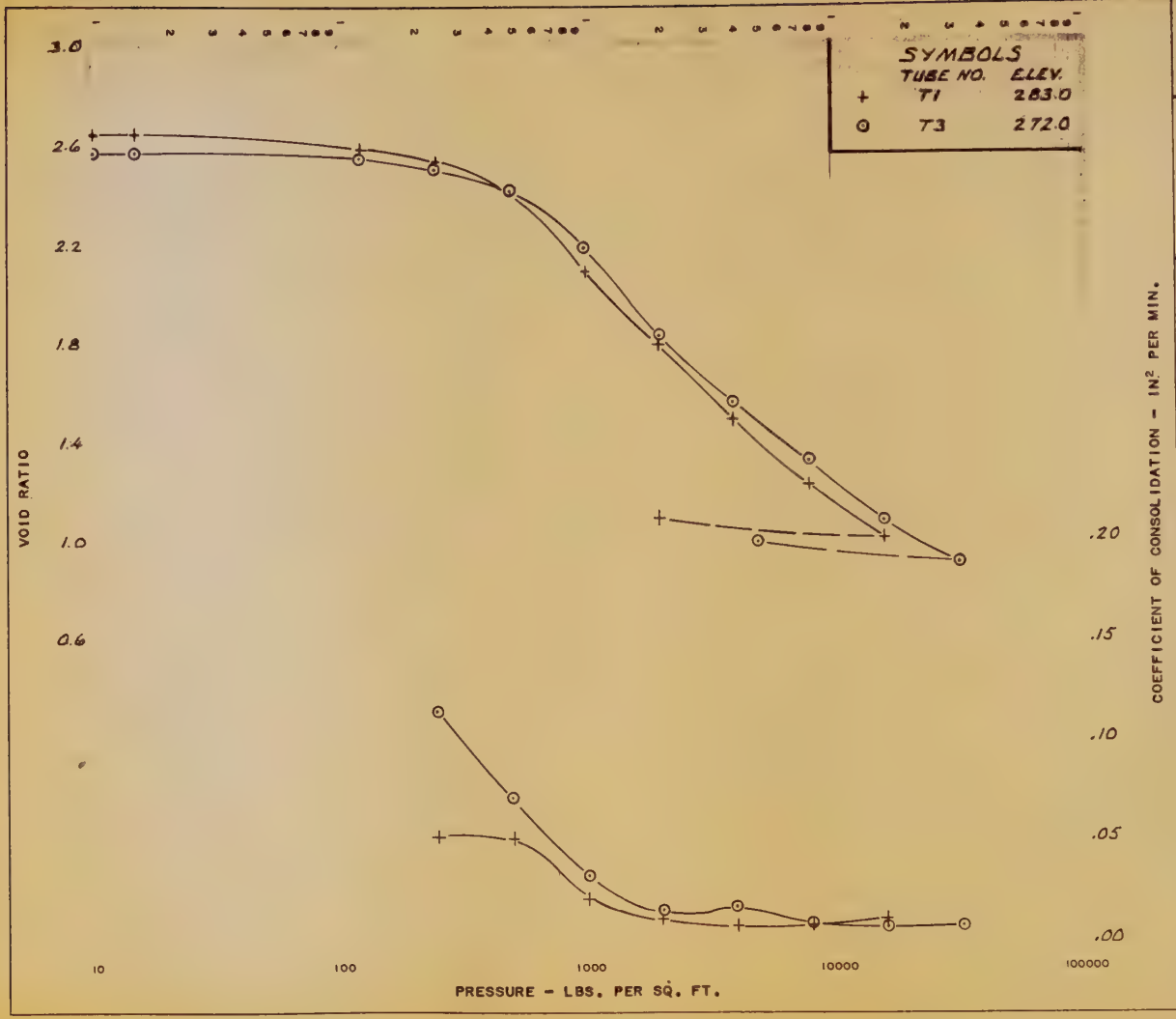
COMPRESSION INDEX

REMARKS: FOR DETAILED SUMMARY OF CLASSIFICATION TEST DATA SEE DRAWING NO. 10 SM 1840

DRAWN BY J. Masi DATE 10/13/72
CHECKED BY R S Cheney DATE 10/13/72

SM 292 (11/67)

10 SM 1842 D



STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

CONSOLIDATION TEST

PROJECT Interstate Route Connection 518
P.I.N. 0024.11.111

HOLE NUMBER P66 DEPTH _____

STATION _____ OFFSET _____

LABORATORY NUMBER _____

DATA CODE _____ MACHINE NUMBER _____

VISUAL DESCRIPTION
Very Soft Gray Organic SILT, with a trace of Sand and Shells

SAMPLE PROFILE

TEST SET UP BY _____ DATE _____

RANGE OF CLASSIFICATION TESTS

MOISTURE CONTENT	94.0 TO 97.6	%
WET DENSITY	86.6 TO 89.5	PCF
SPECIFIC GRAVITY	2.57 TO 2.66	
LIQUID LIMIT	95.5	
PLASTIC LIMIT	39.6	
PLASTIC INDEX	55.9	
ORGANIC CONTENT		%

PERCENT FINER THAN
.074MM _____ .020MM _____ .002MM _____

PRECONSOLIDATION PRESSURE
MINIMUM _____ MAXIMUM _____

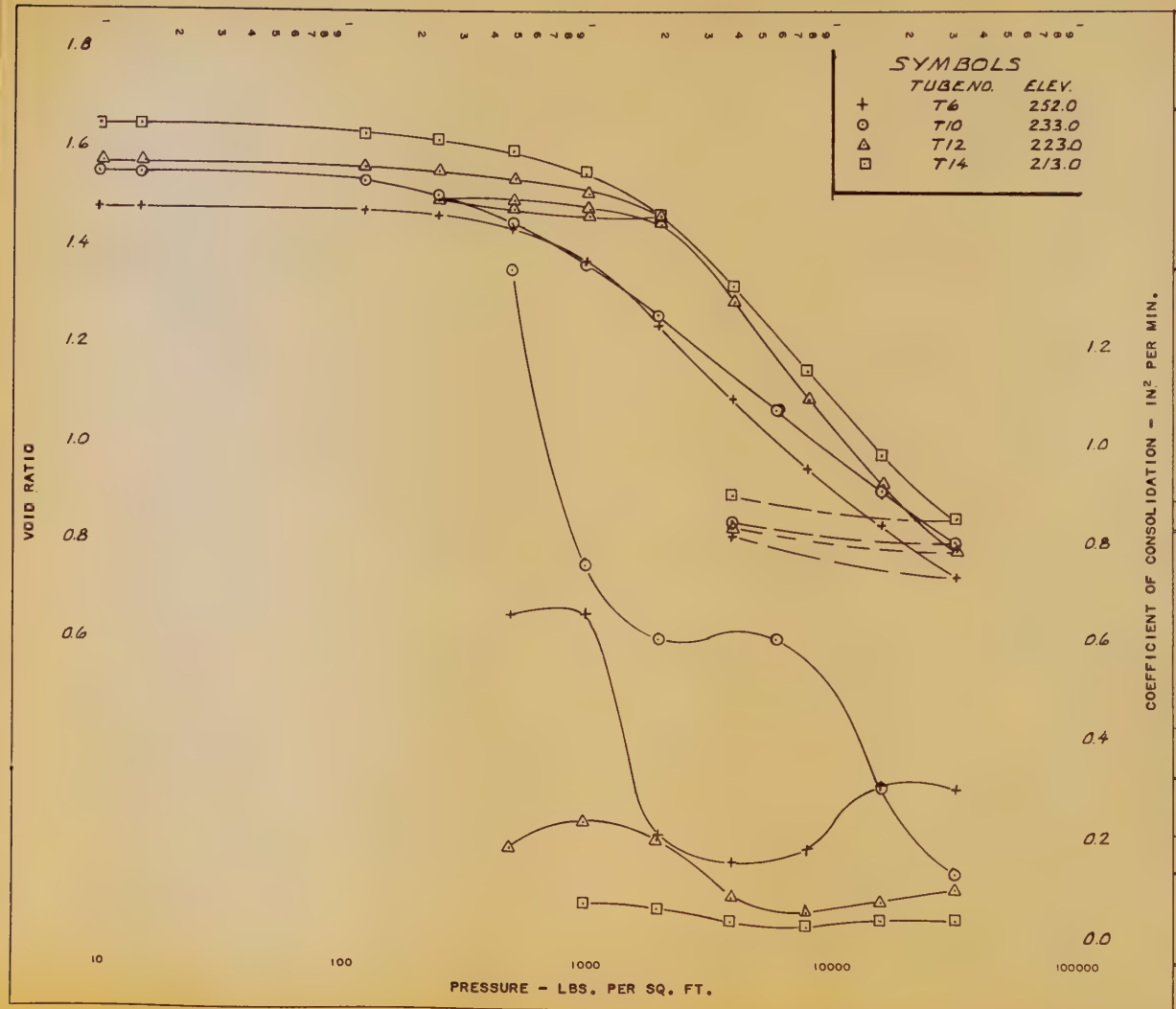
COMPRESSION INDEX _____

REMARKS: For detailed summary of classification test data see Drawing No. 10 SM 1840

DRAWN BY J. Mioi DATE 12/12/72
CHECKED BY R.J. Cheney DATE _____

SM 292 (11/67)

10 SM 1842 E



STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

CONSOLIDATION TEST

PROJECT INTERSTATE ROUTE CONNECTION 518
P.I.N. 0024.11.111

HOLE NUMBER P66 DEPTH

STATION OFFSET

LABORATORY NUMBER

DATA CODE MACHINE NUMBER

VISUAL DESCRIPTION
SOFT GRAY ORGANIC SILT, WITH A TRACE OF SAND AND SHELLS

SAMPLE PROFILE

TEST SET UP BY DATE

RANGE OF CLASSIFICATION TESTS

MOISTURE CONTENT 51.7 TO 60.5 %
WET DENSITY 100.3 TO 103.5 PCF
SPECIFIC GRAVITY 2.68 TO 2.70
LIQUID LIMIT 56.0 TO 59.2
PLASTIC LIMIT 28.0 TO 30.2
PLASTIC INDEX 28.0 TO 29.0
ORGANIC CONTENT %

PERCENT FINER THAN
.074MM .020MM .002MM

PRECONSOLIDATION PRESSURE
MINIMUM MAXIMUM

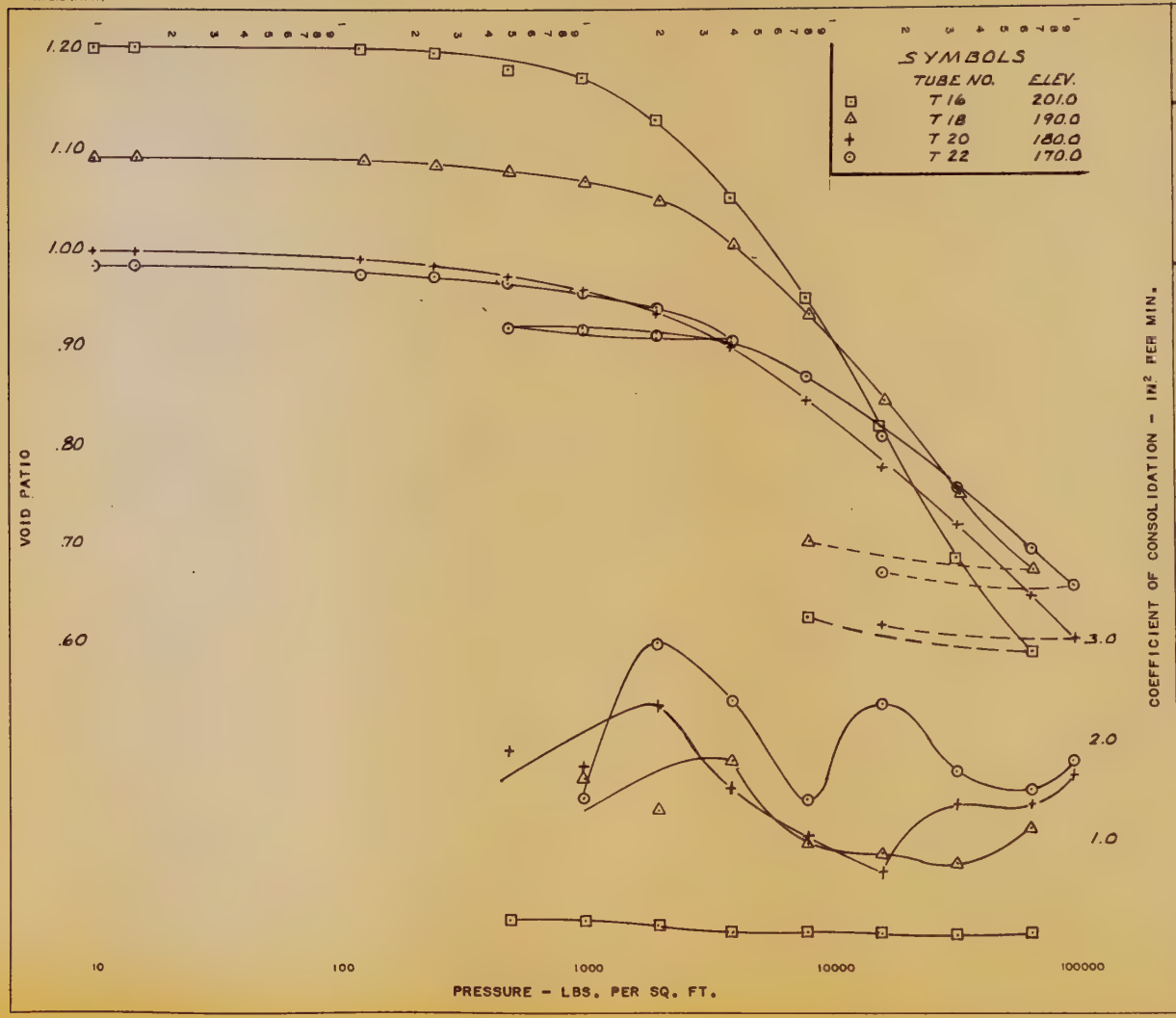
COMPRESSION INDEX

REMARKS: FOR DETAILED SUMMARY OF CLASSIFICATION TEST DATA SEE DRAWING NO. 10 SM 1840

DRAWN BY J. Mori DATE 10/13/72
CHECKED BY R S Cheney DATE 10/13/72

SM 292 (11/67)

10 SM 1842 F



STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

CONSOLIDATION TEST

PROJECT INTERSTATE ROUTE CONNECTION SIB
P.I.N. 0024.11.111

HOLE NUMBER P66 DEPTH

STATION OFFSET

LABORATORY NUMBER

DATA CODE MACHINE NUMBER

VISUAL DESCRIPTION
LOOSE LAYERED: GRAY ORGANIC SILT, WITH A TRACE OF SAND
GRAY SAND AND SILT

SAMPLE PROFILE

TEST SET UP BY DATE

RANGE OF CLASSIFICATION TESTS

MOISTURE CONTENT	33.9 TO 38.4	%
WET DENSITY	110.9 TO 115.2	PCF
SPECIFIC GRAVITY	2.70 TO 2.72	
LIQUID LIMIT	29.5 TO 33.3	
PLASTIC LIMIT	23.2 TO 24.8	
PLASTIC INDEX	6.3 TO 9.6	
ORGANIC CONTENT		%

PERCENT FINER THAN
.074MM .020MM .002MM

PRECONSOLIDATION PRESSURE
MINIMUM MAXIMUM

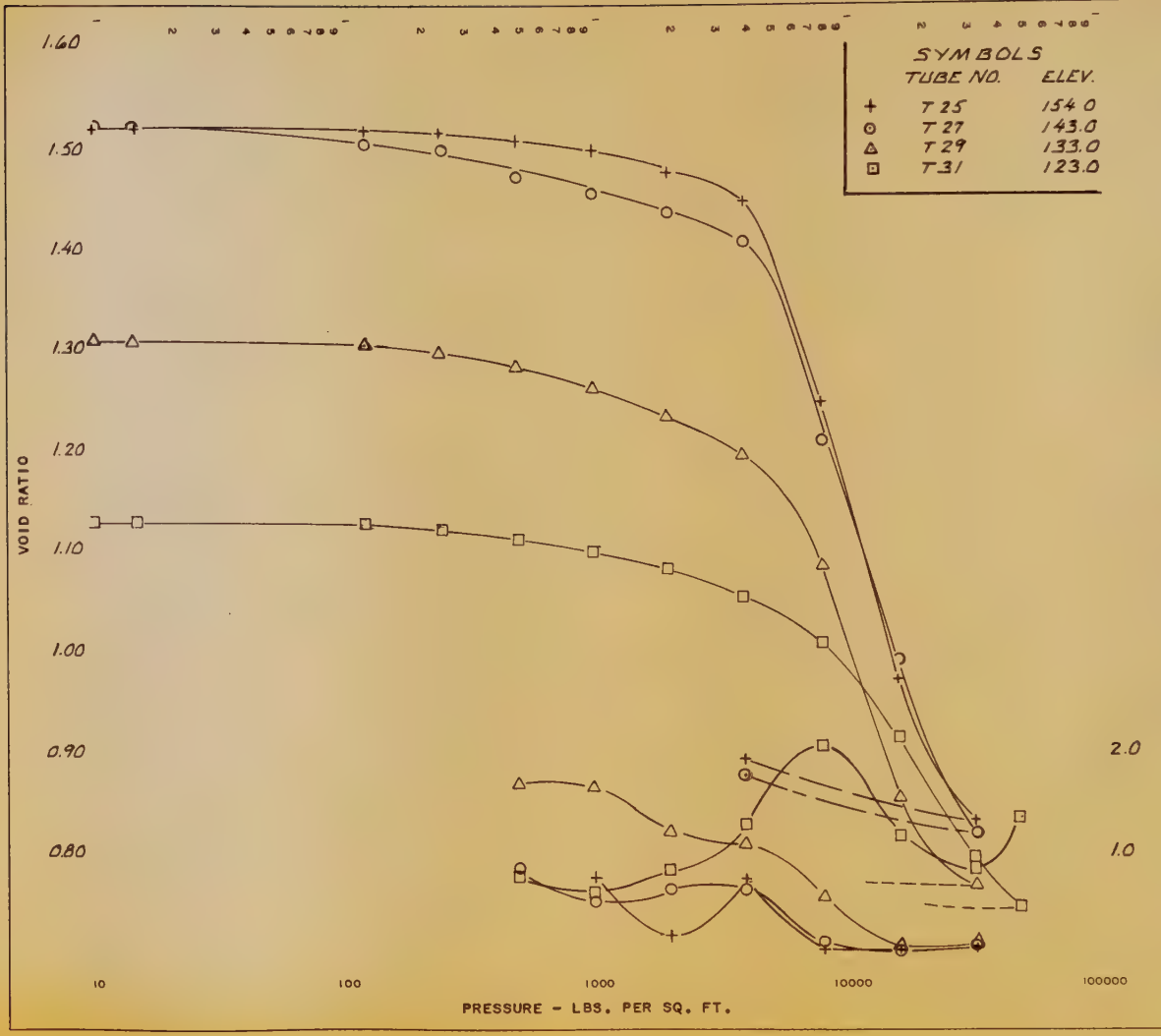
COMPRESSION INDEX

REMARKS: FOR DETAILED SUMMARY OF CLASSIFICATION TEST DATA SEE DRAWING NO. 10 SM 1840

DRAWN BY DATE 10/13/72
CHECKED BY R.S. Cheney DATE 10/19/72

SM 292 (11/67)

10 SM 1842 G



STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

CONSOLIDATION TEST

PROJECT INTERSTATE ROUTE CONNECTION 5/8
P.I.N. 0024.11.111

HOLE NUMBER P66 DEPTH

STATION OFFSET

LABORATORY NUMBER

DATA CODE MACHINE NUMBER

VISUAL DESCRIPTION
MEDIUM COMPACT LAYERED: GRAY ORGANIC SILT, WITH A TRACE OF SAND GRAY SAND AND SILT

SAMPLE PROFILE

TEST SET UP BY DATE

RANGE OF CLASSIFICATION TESTS

MOISTURE CONTENT	54.7 TO 55.1	%
WET DENSITY	105.4	PCF
SPECIFIC GRAVITY	2.74 TO 2.75	
LIQUID LIMIT	49.4 TO 54.6	
PLASTIC LIMIT	22.6 TO 22.9	
PLASTIC INDEX	26.5 TO 32.0	
ORGANIC CONTENT		%

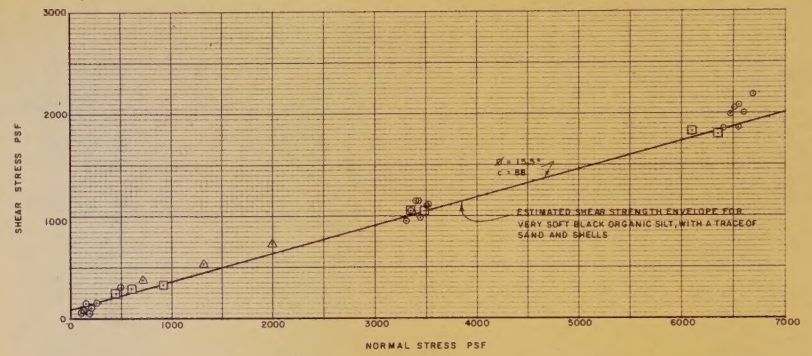
PERCENT FINER THAN
.074MM .020MM .002MM

PRECONSOLIDATION PRESSURE
MINIMUM MAXIMUM

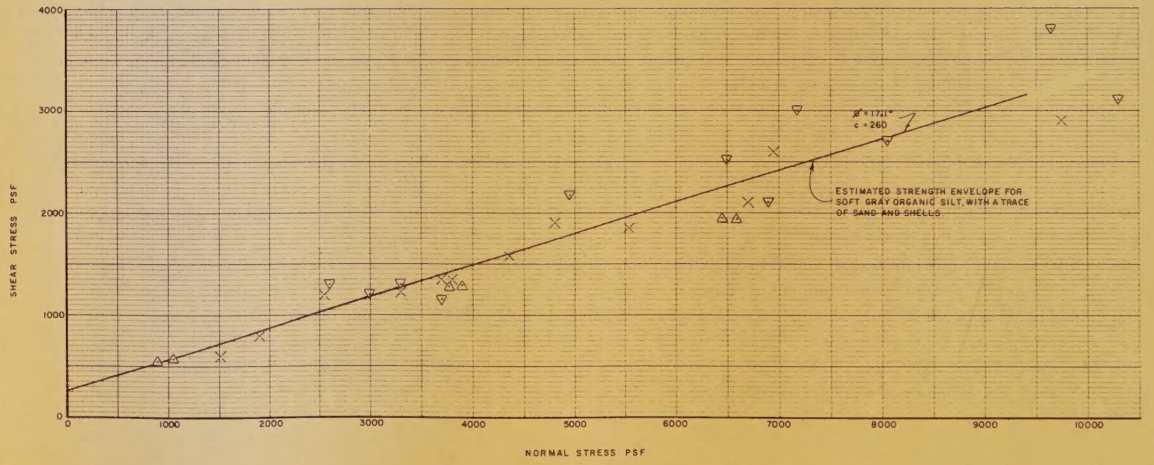
COMPRESSION INDEX

REMARKS: FOR DETAILED SUMMARY OF CLASSIFICATION TEST DATA SEE DRAWING NO. 10 SM 1840

DRAWN BY DATE 12/
CHECKED BY R.J. Cheney DATE 10/13/72



SYMBOLS	DRILL HOLE	ELEV. RANGE
○	P-21A	283-266
□	P-21	277-228
△	P-66	281-256



SYMBOLS	DRILL HOLE	ELEV. RANGE
△	P-40	256-226
▽	P-66	256-202
×	P-76	255-188

NOTE:
THE BASIC DATA FOR ALL STRENGTH TESTS ARE SHOWN ON DRAWING NO. 10 SM 1840A-C

R1- REVISION 1 REVISED SHEAR STRENGTH PLOTS AND SHEET 10 SM 1845 SUPERCEDED 4/1/77

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

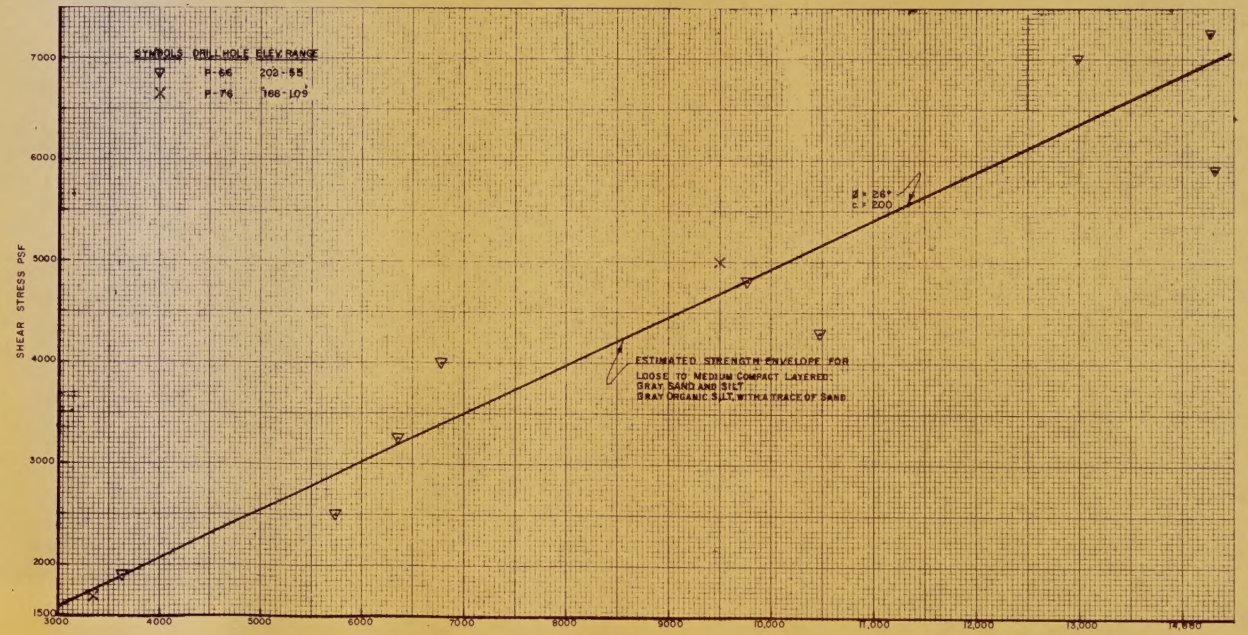
INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY TO 42nd STREET, BOROUGH OF MANHATTAN
P.I.N. 0024.11.111

CONSOLIDATED UNDRAINED SHEAR STRENGTH SUMMARY

PREPARED BY: R.K. Hensey
DRAWN BY: J.J. Mac
CHECKED BY: R.K. Hensey

APPROVED MARCH 31 1977
L. H. Monty
DIRECTOR

REGION NO. 10
COUNTY NEW YORK
DRAWING NO. 10 SM 1845A R1



NOTE:
THE BASIC DATA FOR ALL STRENGTH TESTS ARE SHOWN ON DRAWING NO 10SM1840A-C

R1-REVISION 1 SHEET 10SM1845 SUPERCEDED 4/1/77

PREPARED BY: Emil E. Shepard
DRAWN BY: J.J. Masi
CHECKED BY: R.S. Cheney

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024.11.111

CONSOLIDATED UNDRAINED SHEAR STRENGTH SUMMARY

APPROVED Oct. 13 1972
Wm. P. Hofmann
DIRECTOR

REGION NO. 10
COUNTY NEW YORK
DRAWING NO. 10 SM 1845B-R1

00312
LRI